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AMERICAN ANTIQUITY

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ROUND HOUSES IN THE WESTERN ARCTIC

J. L. GIDDINGS

THE GHOSTS of "round" pit houses in Alaska were dispelled by Henry B. Collins 2 decades ago (Collins 1937: 282-6). They had emanated from the casual remarks of early explorers and the later hasty glances at house depressions. Up to now, 300 or more of the floors of old pit houses in Alaska have been exposed, and they overwhelmingly show that the winter house of the western American Arctic is some variation of a square plan. Even so, exceptions have just turned up — perhaps not merely to prove the rule. They are large oval pits on Choris Peninsula, the remains of early dwellings apparently without corners or entrance passages, or even the means of side entry.

We found them in August of 1956 while on an archaeological and treering survey of the Eschscholtz Bay region of the Chukchi Sea. My companions were Robert Ackerman, of the University of Pennsylvania, and Melvin Reichler of Brown University.* Our plan had been to examine the ocean beaches only after traversing the shores of Eschscholtz Bay and the Buckland River, but while stormbound on Choris we discovered the oval house pits and made preliminary tests.

The present beach of sand and gravel on the seaward side of Choris Peninsula nearest its rocky tip stretches over a mile between 2 stone outcrops of the tundra-covered headland. Back of the high, sod-coated present beach is a succession of older beaches that fill an embayment over 600 feet wide at the center. The oval house pits lay in the ninth, and oldest, of the former beaches, at the widest part of the embayment, and at the foot of rather steep slopes of the hill (Fig. 1). The rim of the farthest north pit took the form of an ellipse 42 by 24 feet along bisecting lines. Southward 160 feet along the same beach was another pit measuring 31 by 24 feet, and 180 feet farther was the third pit, 38 by 24 feet in dimensions. All 3 pits had their greatest length east and west.

A smaller oval pit lay westward and seaward of each large pit (see Fig. 1). The small pits near the end house pits were only 36 and 40 feet away from their respective houses on the same beach, but that nearest the middle house lay 150 feet away and on the seventh beach from the sea. If the smaller ovals belong with the large dwelling sites, as they appear to do in other respects, this indicates that the site was occupied while at least 3 beaches were already in existence.

We excavated one of the house pits, the northernmost, upon returning from the Eschscholtz Bay survey. In size alone this pit (Fig. 2) is remarkable. Encompassing 5 or 6 times the area of the usual dwelling house in this region, it is equaled in size only by the huge "ceremonial house" of Ipiutak culture excavated in 1950 at Deering by Helge Larsen (1951: 83-8). We excavated in alternating strips running north and south across the rim, exposing floor at intervals of a few feet, then removing the intervening sections. An upper layer of sod and black humus, from 5 to 10 inches thick, lacked cultural material. Below this was sand and streaks of light gravel, sometimes containing a few flakes of flinty material. Floor level began from 15 to 24 inches in depth, depending upon nearness to the surface rim of the depression. This was the kind of thick gravel floor that results when each press of the walking foot turns under the pebbles that have been most recently on top. Very few fibers of wood appeared on the top of the floor layer, though some were traceable at higher levels. Those timbers that could be traced for some distance at either end of the house were flattened to ½ inch or less in thickness and were rotten and matted with rootlets. They seem to be the remnants of either a collapsed roof or the upper parts of walls. The bases of posts could be often identified by a dark stain in the ground and a mass of grass roots

* These studies were aided by a contract between the Office of Naval Research, Department of the Navy, and the Arctic Institute of North America. Ackerman was further aided by a research fund from the Anthropology Department of the University of Pennsylvania.

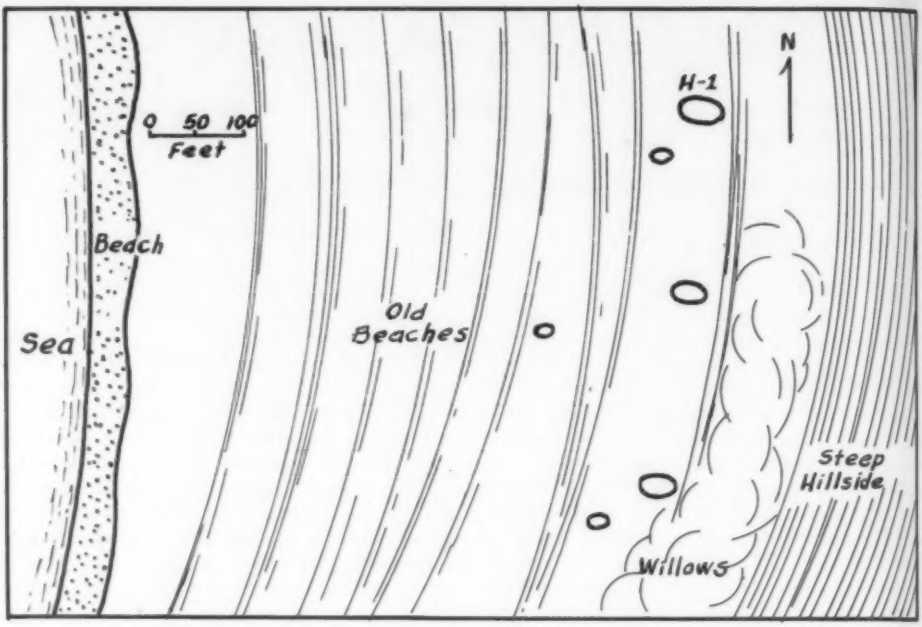

FIG. 1. Sketch map of the old site at Choris Peninsula.

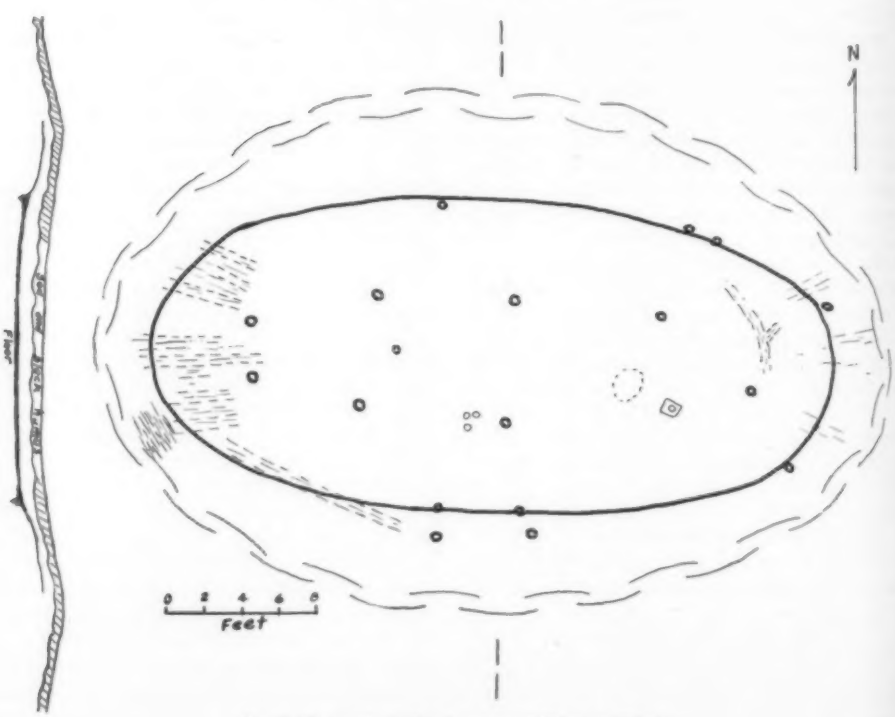

FIG. 2. Plan and profile of excavated House 1, Choris.

that had found special nourishment in these areas.

A continuous dark stain that extended 3 or 4 inches into the gravel at the outer edge of the floor level probably stood for the base of a wall once delimiting the walked-on part of the house floor. The dark, culture-bearing gravel did not end with these lowest traces of wall outlines, however. In profile, the dark streak which had been the walked-on floor rose rather sharply and then curved outward toward the center of the rim marking the house depression on the surface (see cross section, Fig. 2). This could mean that a low vertical wall once retained a narrow bench at a higher level, and that the wall of the house, as distinct from the wall limiting the floor, may have sloped inward from the surface of the ground as it was at the time of building.

The postmolds that could be identified with certainty fall into 2 patterns. Seven were at the edge of the floor. They may be either the traces of a continuous retaining wall or the uprights that held in place a wall of another kind. Two of these deep postmolds lay more than 1 foot beyond the floor edge on the south side. Though they remind one of the side posts of some kind of an entrance, we saw no trace of a dip or thickening of the floor level at this part of the house. The second pattern seems to be that of 2 curved rows of central supporting posts, the rows bending toward one another at the ends, and describing a long, narrow ellipse within the 2 larger ellipses of floor outline and surface rim of the house. Three sets of these postmolds are paired, and it is possible that we failed to identify dim molds where the other two should be, or that those posts had not been deeply driven into the ground.

The house lacked a well-defined fireplace. A small charred area in the floor somewhat east of center may represent a fire in the house, but it lacks the quantity of charcoal or ash that would identify it as a regular cooking or heating place. Near this charred area was a large stone lamp. We might conclude from this that the house was heated and lighted by means of oil lamps rather than by an open fire of driftwood.

Stone boiling requires an open fire rather than the heat of an oil lamp; hence the cooking that might have been done in such a house as this could be expected to have been boiling in containers suspended over the limited flame. Cooking within the house is strongly implied by the large number of potsherds in and about the floor, the parts of many broken vessels. At least two of the pots had suspension holes near their rims (Fig. 3).

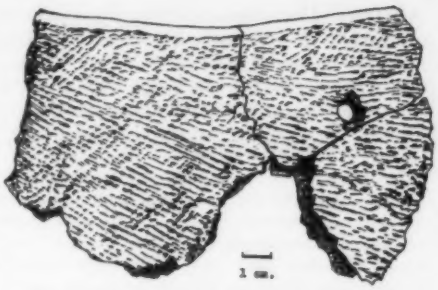

FIG. 3. Fragment of pottery vessel.

The size of this building was so great as to raise the question of its use as a dwelling. An Eskimo *kazgi*, or ceremonial house, is often larger than a dwelling, and its plan is sometimes variant. If the ceremonial house is used Eskimo-fashion — that is, primarily as a men's club house and work shop, and as the place where community dances are held, its contents are likely to be heavily weighted toward men's activities. The Choris house showed no such concentration of materials. Rather, it gave evidence of having been used as much by women as by men if we may attribute bone needles and fragments, and the pottery, to women's sewing and cooking activities. Bones had been scattered about the floor and heaped in the ends of the house as one expects to find them in dwelling sites where meat is cut up, cooked, and eaten within the untidy family group.

The smaller oval pits apparently are not those of dwellings. We excavated a strip across the center of only the one nearest the excavated house. Cultural refuse was lacking, although a well-defined floor level attests to activity other than storage within the hut. Cache pits such as those along the Kobuk River lack this kind of floor. If these were huts for women's confinement periods we could expect to find traces of artifacts and bones. A barren, but well-trodden, floor suggests strongly that the small ovals were sweat-baths distinct from dwellings or kazgis, a characteristic of the Kobuk and neighboring inland regions, and some of southern Alaska (Birket-Smith and de Laguna 1938: 369-70; Heizer 1956: 23-4), where some were warmed by stones heated outside the house.

Artifacts. The collections from the one house pit number 152 artifacts or fragments and about 250 potsherds considered large enough to save. We shall examine first the traits most likely to fall within a woman's sphere of activity, such as pottery, lamps, and cutting, sewing, and scraping tools.

Pottery. All of the pottery is a well-fired, feather-tempered, thin variety stamped over all of the outer surface much like that previously designated "Norton linear-stamped" (Giddings 1949: 88-9; Griffin 1953: 40-2; Oswalt 1955: 34). None of the check-stamped ware of Norton culture or the other varieties of the earliest previously know Alaskan pottery appear in the Choris house, however. A large part of one pot was reconstructed (partly shown in Fig. 3). It is a vessel about 18 cm. in diameter at the rim, and bulging to about a 24 cm. diameter before narrowing to either a conical or a round base. One of probably 2 suspension holes is located 2.5 cm. below the rim. The rim is plain, rounded over, and no thicker than the remainder of the upper part of the vessel (9 to 12 mm.). The outer surface of the pot is covered with striations running continuously downward counterclockwise from the rim, but apparently applied by many stampings of a paddle. The grooves are about 3 mm. apart, and lands and grooves are about equal in width. At a few points about the periphery of this vessel the paddle has been first applied at right angles to the final pattern, adding a faint effect of crosshatching.

The sherds are black or gray inside, but the outsides range from gray to buff. The paste has been thickly mixed with down feathers, and lacks the sand temper of most of the pottery of the Norton culture at Cape Denbigh.

Lamp. The single lamp found in the house was a squarish, shallow basin pecked in a block of sandy schist the margins of which were left as a natural shelf about the basin. We were able to expose and photograph this object, but when we attempted to remove it the shattered stone dissolved into sand and mica. It was identical

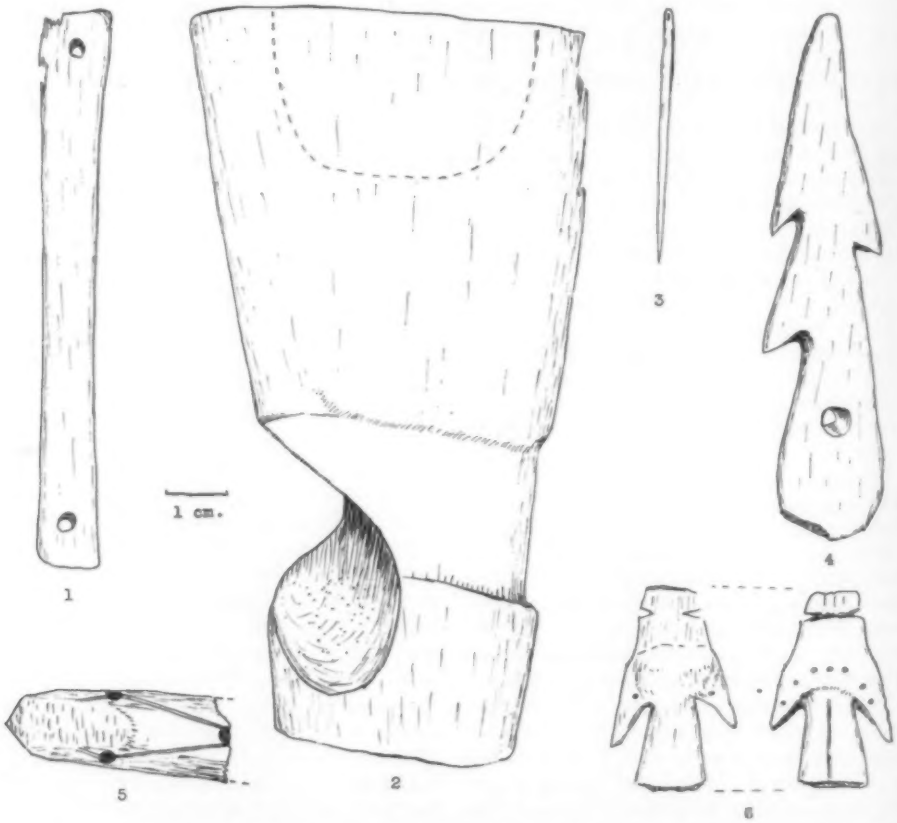

FIG. 4. Bone, ivory, and antler artifacts. *1*, antler handle; *2*, socketed antler adz head; *3*, bone needle; *4*, antler harpoon dart head; *5*, ornamented ivory fragment; *6*, tip of ivory harpoon head.

with stone lamps found in sites of the upper Kobuk River and thus far known only from that inland region where they have continued to be used until very recent times (Giddings 1952: 85-6, Pl. 8, *lower right*). Stone lamps are frequently found in the Norton culture sites, but these, like stone lamps in the Aleutian Islands and southern Alaska, are usually finished by pecking over all the surface, or at least about the rims.

Needles. The 7 needles include one whole specimen (Fig. 4, 3) and others nearly so, their thicknesses ranging from 0.8 mm. to 1.4 mm. The complete needle is only 0.8 mm. thick, and it is 43 mm. long. The small eye, only 0.2 mm. wide, has been created by drilling from 2 sides. A broken needle, 1.4 mm. in diameter, has an eye made in the same way which is 0.5 mm. wide. Two thin strips of bird bone cut lengthwise by grooving with a burin or analogous instrument seem to be blanks for needles. A wider strip of the same material shows zigzag engraved lines on the outer surface, as though a needle were to be made from a piece of previously engraved bone.

The 7 needles representing finished specimens make up 4% of the Choris artifacts, a figure to be tentatively compared with the 148 needles from Ipiutak site at Point Hope that make up 1.5% of the total. Although Larsen and Rainey point out that "similar needles are known from most Eskimo," they do not sufficiently stress the abundance of needles at Ipiutak (1948: 90). Few sites in the Eskimo area have produced needles in quantity. It is to be especially observed that these early sites, in which preservation of bony materials is not of a high order, were those of skin sewers whose needles were numerous and as fine as any made of bone. The remarkable new Dorset houses and middens just now being described also seem to have a relative abundance of needles preserved (Collins 1956: 67, Pl. 1, 30-2; Meldgaard 1955: 121).

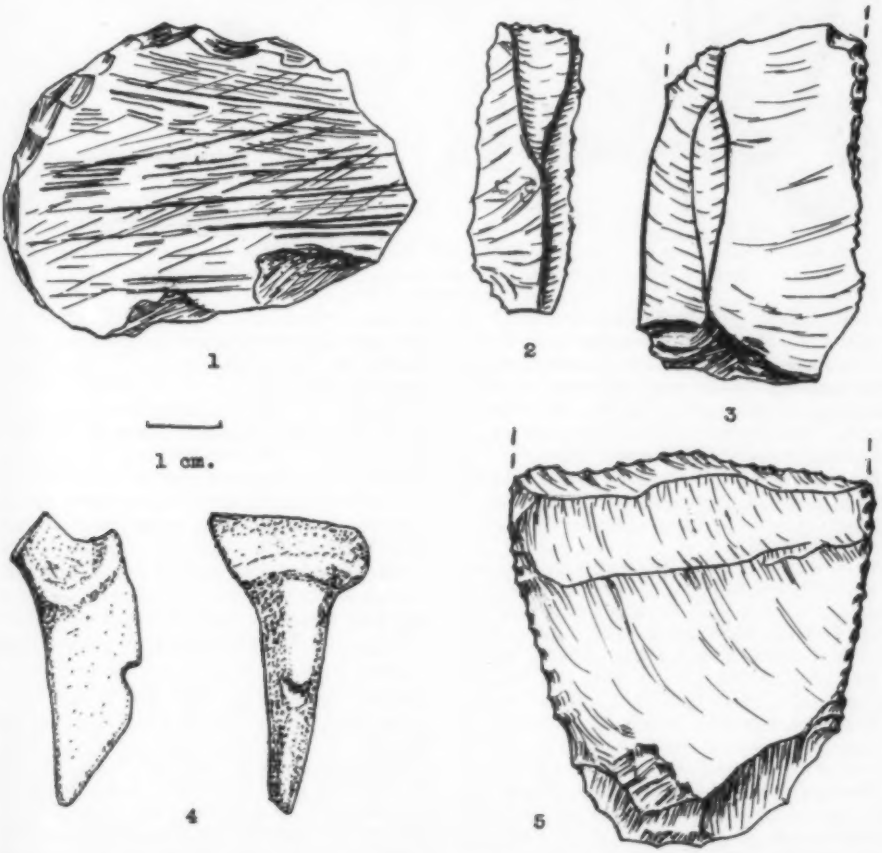

FIG. 5. Stone artifacts. *1*, scraped and chipped slate blank or fragment; *2, 3*, blade-like knives or scrapers; *4*, sandstone object; *5*, large-flake scraper or knife.

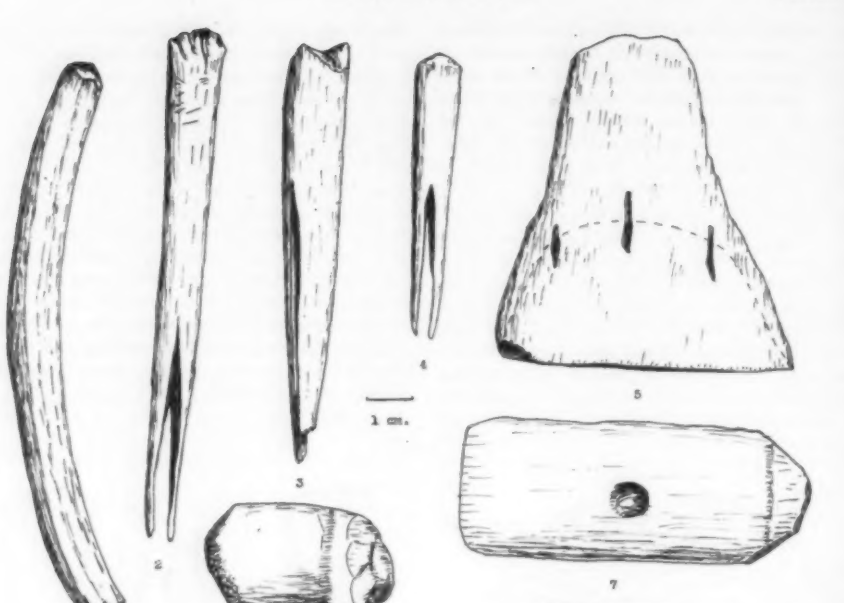

FIG. 6. Antler and bone artifacts. *1*, bone flaker; *2-4*, antler projectile heads; *5*, antler handle; *6*, flaking hammer of antler; *7*, antler drill bearing, also used as wedge; *8*, unfinished harpoon head.

Scraped Slate Knife. If the 7 fragments of slate blades are from knives like the Eskimo woman's ulu, the form of ulu is not semilunar, but nearly straight-edged. Four of the fragments strongly recall this type common to many periods of the western Arctic (see Nelson 1899, Pl. 47, *1*, *4*). One specimen is drilled from both sides to form a hole 8 mm. in diameter, apparently one of 2 holes for the attachment of a handle. The smaller fragments have only 3 cm. of polished edge each, and could be either parts of ulus or of blades, longer than wide, which are sharpened at one end.

The unusual aspect of this slate work is that each piece is very roughly scratched on both faces except where the cutting edge has been ground against a whetstone. This is a trait held in common with the Norton culture, where slate work is also rare in contrast with flint work. Most of the slate artifacts of Eskimos and others have been produced by grinding slabs of slate on sandstone, then polishing them on whetstones of finer-grained material. A grindstone can hardly account for the deep grooves that crisscross all of the Choris, and most of the Norton specimens, however. It is quite certain that the Choris slate was not ground into shape, but was *scraped*. One of the broad flint scrapers found in the site produces this effect when drawn across a piece of slate, and there seems little doubt that the Choris specimens, and probably most of the Norton culture slates, were scraped with flint side scrapers and then edged on a whetstone. The illustrated specimen, Figure 5, *1*, is chipped all around the edge and may be either a blank for a small blade or the fragment of a larger one.

As this is probably the earliest slate work to turn up in the Bering Strait region, it is well to note that it is both very scarce and crude, lacking, in this sample at least, all of the forms that need to be compared on an early time horizon between the Atlantic coast of North America and Scandinavia (Gjessing 1944; Holmes 1919: 22-5; Spaulding 1946).

Whetstone. As might be expected in a site containing a minimum of polished stone tools, the whetstones are scarce. Of 6 specimens only one is large.

Grooved Stone. The fragments of 2 sandstone shaft polishers or pointers are like those of Norton culture, and sites of southern Alaska (Heizer 1956, Pl. 35, *k*, *o*).

Pumice Abraders. Four irregular pieces of pumice have been rubbed on one or more surfaces as though in a polishing process, and 3 others are flat, thin, and rubbed on both broad faces. One of these has a shallow groove in one face, as though it had been used in the polishing of awls or needles. A single pumice abrader was found in the Norton culture levels at Cape Denbigh. Rubbed pumice lumps were found in the lower levels at Kodiak (Heizer 1956: 47, Pl. 35 *i*).

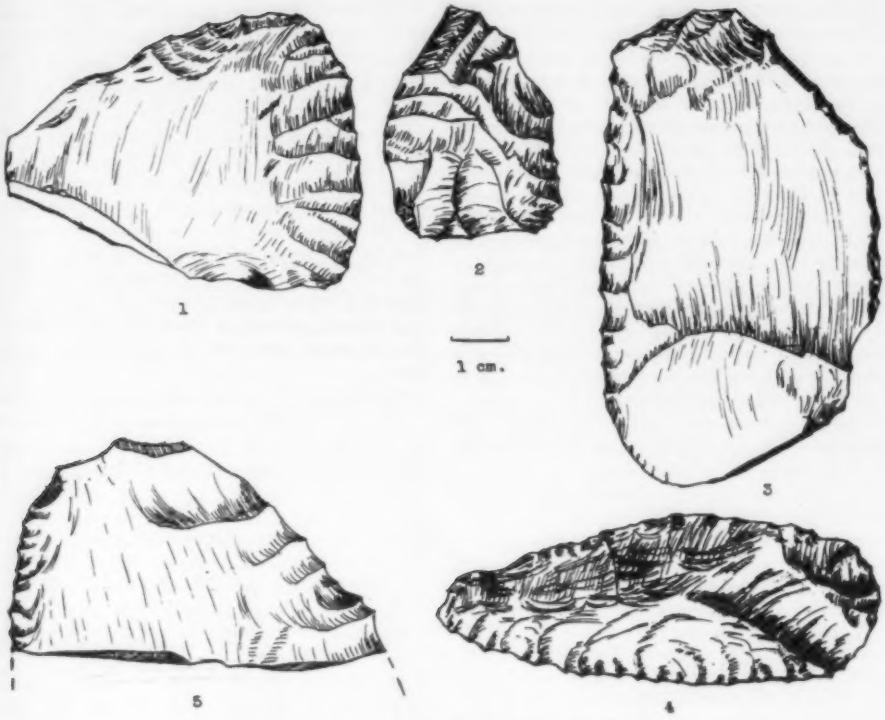

FIG. 7. Knives and scrapers of flinty material.

Scapula Scraper. Two scrapers made of caribou scapula with the vane removed are very similar to those found in all of the periods of Kobuk River culture (Giddings 1952: 40), in Norton culture, and in the Kachemak Bay III levels of southern Alaska (de Laguna 1947: 191). Used recently by the Tena along the Yukon River, and by the inland Eskimos, this scraper is primarily a woman's fish scaler along the Kobuk River.

Rake or Scoop. Another object is closely similar to women's household implements recently used along the Kobuk River and is common to earlier periods in that region (Giddings 1952: 79). This is the broad "paddle" of caribou antler, the tines of which have been worn down short, and the base of which has been cut off by adz-girdling.

The objects that are most readily associated with the activities of men are the parts of drills, adzes, knives, harpoons, spears, and arrows, and such things as wedges, punches, scrapers, and flint flakers.

Wedge. Several pieces of cut antler are of about the right size and shape to be blanks for wedges of the kinds used by early and recent Alaskans in splitting driftwood. A wedgelike implement 14 cm. long is opposite-notched at center, as if in preparation for dividing it into 2 small wedges. One of the antler drill bearings (Fig. 6, *7*) appears to have been used as a wedge.

Antler Tine Punch. A single specimen is a bluntly sharpened antler tine 9 cm. long, recalling identical objects in some of the Kobuk River sites (Giddings 1952: 67, 70).

Drill Bearing. Two drill bearings are strips of ivory taken from the hollow end of a walrus tusk and 2 specimens are of antler (Fig. 6, *7*).

Drill Bit. Only 2 drill bits were identified in the collection, and these are of flinty materials. One (Fig. 9, *1*) is one end of a thick chert biface that shows signs of wear about the edges. The other (Fig. 8, *4*), of black chert, may be an arrow point, the very tip of which is broken off. None of the polished drill bits of basalt and silicified slate that are numerous in Norton culture are found at Choris.

Adz Head. A complete adz head of antler (Fig. 4, *2*) has a closed socket 25 mm. deep at its broad end, evidently for accommodating an adz blade with a U-shaped stem lenticular in cross section. Near the opposite end is a wide lashing groove which deepens over one edge and merges beyond the center with a deep hafting groove. The hafting groove, whittled out to fit over half of a

cylindrical handle 22 mm. in diameter, enters the head from below at a 50° angle. The lower face of the adz head is not altered, except by the handle socket.

This method of hafting an adz head appears to be unique in western Alaska. A few early adz heads of the Old Bering Sea culture are perforated through the center (Collins 1937: 160, Pl. 46, 6), but only 3 specimens, from Near Ipiutak burials and a house at Point Hope, seem to be provided with a slot for side-lashing the handle. These specimens (Larsen and Rainey 1948: Pls. 81, *13*; 83, *17*) differ from the Choris head, however, in that the slot is at right angle to the head and appears to have been primarily a device for centering a handle rather than for insetting only part of the shaft. One form of adz head from Kodiak Island (Heizer 1956, Fig. 48) is closely similar to the Choris specimen, in accommodating a round handle set in the side. The Kodiak specimens seem to have been hafted at right angles.

The blank for an antler adz head of similar dimensions has been provided with a blade socket but is otherwise unfinished.

Adz (?) Blade. A distinctive large bifaced blade of black chert (Fig. 7, *1*), shaped to about 9 mm. thickness by removing wide flakes from both faces, has the wide end boldly retouched in regular, parallel flakes toward both faces. The finished object has a very even cutting edge — almost straight in spite of its possessing no plane or concave face but only the meeting of 2 convex faces. The face that is slightly more curved than the other is shiny near the edge, as though from cutting through organic material, and the edge itself is slightly dulled. This particular piece fits almost exactly the slot in the unfinished adz head, and it is proposed that this is an adz blade that was not meant to be ground.

A broken specimen of black chert shows the same meticulous edge treatment, and may have been a similar blade.

The absence of any piece of polished silicified slate or other hard stone such as were used by people of Norton, Ipiutak, and other cultures as adz blades, leads us to think that all adz blades may have been of chipped flint.

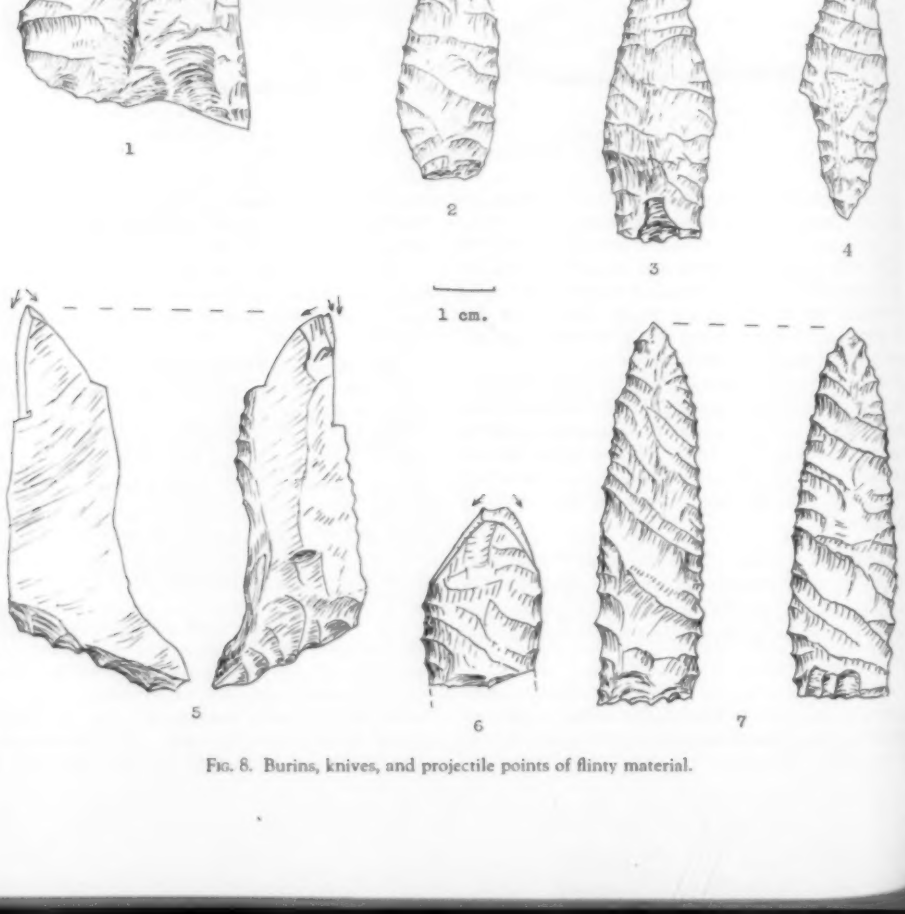

Fig. 8. Burins, knives, and projectile points of flinty material.

Scraper or Ulu Handle. Another possible use for flints shaped like those described above as adz blades is suggested by a singular form of antler handle (Fig. 6, *5*). This is a thin piece of antler, the under side somewhat planed by whittling or grinding, and the wide end slotted to receive the stem of some form of tongued object. Three thin grooves penetrate only one face as far as the blade slot. This handle, with a flint biface in it, might have served either as a broad scraper or as an ulu-shaped knife. In either case, it would be without exact known precedent in the region.

Flaker Tip. A short (35 mm.) section of dense bone, roughly rectangular in cross section and blunted at the ends, is identical with the tips lashed on grooved flaker handles by recent Eskimos of northern Alaska and their forebears. A long (118 mm.) flaker of dense animal rib (Fig. 6, *1*) could have been used without hafting, but it is similar to those of Ipiutak (Larsen and Rainey 1948, Pl. 11, *14, 17*) which may have been hafted.

Flaking Hammer. A flaking hammer of antler (Fig. 6, *6*) is lightly grooved about its circumference for hafting. The wide, convex flaking face is 26 by 20 mm. in dimensions, and shows signs of much use. Flaking hammers similar to this were well represented at both Ipiutak and Near Ipiutak, though usually in a more elaborate form (Larsen and Rainey 1948, Pls. 11, *1-5*; 81, *14*; 86, *4-6*). They also occur in Norton culture, and in the oldest St. Lawrence Island phases (Collins 1937, Pl. 30, *18-20*; Rainey 1941, Fig. 35, *1-3*).

Blade-like Knife or Scraper. Nine large flakes, used as knives or scrapers (Fig. 5, *2, 3*) have been struck from a core in such a way as to resemble closely the unifaced blades of the Old World. Although no prepared cores were found, it is likely that the parallel-edged blades were struck with calculated precision rather than by chance. Such large cores have existed in Alaska at some time in the past (Solecki 1950: 67).

Flake Scraper. Thirty-two irregular flakes are classed as scrapers because of retouch, often only by use, about the edges.

Large-flake Scraper or Knife. One whole (Fig. 7, *3*) and 6 fragmentary (Figs. 5, *5*; 7, *5*) knives or scrapers are made from single broad flakes, with one slightly convex edge more carefully retouched than the others. Large enough to be held comfortably in the hand without hafting, these are closely similar to flints from early sites in the far interior of Alaska (Skarland and Giddings 1948, Pl. 15, *o, p*, Birch Lake; *n*, Alaska Range). Large-flake scrapers of somewhat different forms occurred in the Ahteut site on the Kobuk River (Giddings 1952, Pl. 19, *5, 7*), and in sites of the Brooks Range (Irving 1953, Pl. 4).

Bifaced Knife. An unusual object of black chert (Fig. 8, *1*) is carefully retouched about the tongue-shaped curved edge to form a thin cutting edge, but it is left rough elsewhere, as though the rough part were to be enclosed in some form of haft, exposing only the cutting edge. It is not precisely like any other known knife blade, but it recalls a curved blade common to both Dorset (Harp 1951, Fig. 57a, *7*) and Norton cultures (Giddings 1949, Fig. 3 *c*).

Unifaced Flakeknife or Scraper. Three broken flints, one of gray chert and two of black chert, are of a type well known from Ipiutak (Larsen and Rainey 1948, Fig. 24, *b, e*, Pl. 17, *17-19*), Norton culture, and the Denbigh Flint complex (Giddings 1951, Fig. 59b, 8), and from the earliest St. Lawrence Island phase of culture (Collins 1937, Pl. 41, *20-27*).

Burin. An object of red jasper (Fig. 8, *5*) gives a first impression of being a flakeknife like those described in the preceding paragraph. At a second glance, however, it is seen to be a handsome bec-de-flute burin based on a blade. This is unlike any of the burins from Cape Denbigh or related sites in the American Arctic, partly because of the burin technique, but largely because it is designed to be held in the hand rather than hafted as most American burins seem to have been. A few of the Denbigh burins were bec-de-flutes in that burin blows were directed at sharp angles to one another to give the burin a pointed working edge (Giddings 1951, Figs. 59a, *3-4*; 60a, 8). The Choris specimen has been given a heavy and a light burin blow on each edge to create a very sharp tip where the 2 scars on either side converge. The slanting edge at the end opposite the burin tip is no accident, but the result of careful blunting which creates a squared-off end. Trimming along the middle of either edge of the convex surface has provided blunt edges here as well. If this object is taken into the right hand it settles naturally between the tip of the thumb and the second joint of the forefinger, with the tip projecting, and the blunted opposite end firmly pressing against the muscle of the upper palm.

Another burin of gray chert is broken at the base, and takes a different form at the tip. The burin scar along the left margin (as shown in Fig. 8, *6*) has been cut across by a curving scar over the right margin. This second scar shows the negative bulb of a true burin blow, but if it was intended to curve precisely as it did, this is an unusual element in the technique of burin making. About the edge of the plane face where it meets the burin scars there is a slight scouring that indicates that the implement was used as a plane or scraper.

Spatulate Knife. A chert biface (Fig. 7, *4*) is evenly flaked over both faces except for the small end, which is left coarsely flaked, indicating use on both long edges and the broad end. It resembles a curiously hafted specimen found at the Platinum Village site of southwestern Alaska (Larsen 1950, Fig. 57, 6).

Slab Knife. This name is given to objects made by simply chipping a blade edge on a natural plate or slab of slaty material. Two fragments are of partly silicified slate, thin plates of which are flaked from both faces thinly along each edge. A large knife or chopper, also fragmentary, is made of a slab of silicified slate 7 mm. in thickness. Both knives and points made of slabs of similar material occur in Norton culture.

Parts of harpoons found at Choris include toggle harpoon heads and a probable harpoon blade, a harpoon dart head, a probable foreshaft fragment, and an ice pick.

Harpoon Ice Pick. A slender specimen 26 cm. long is made of walrus penis bone. It is beveled for attaching to a shaft at one end, is oval in cross section, and draws toward a point at the broken end. A drilled hole, 5 mm. in diameter, penetrates the proximal end. This is similar to an ice pick from Norton culture, and takes a form common to the earliest Old Bering Sea cultures (Collins 1937, Pls. 29, *13-15*; 32, *1-6*; Rainey 1941, Fig. 11, *11, 13*) and Ipiutak (Larsen and Rainey 1948, Pl. 39, *9-12*). In view of the many "fishing ice picks" of the Kotzebue (Van Stone 1955: 91-2) and Kobuk River sites (Giddings 1952: 38-40), however, we cannot be certain of its function.

Harpoon Head. The tip of an ivory harpoon head (Fig. 4, *6*) has been cut from the body by girdling 1 mm. deep and breaking. This tip recalls Mathiassen's Thule Type 2 (Mathiassen 1927, Pt. 1: 24), which is very widespread in the Arctic in early as well as late periods. This fragment differs from known forms, however, in the following respects; one barb is longer than the other; the 2 barbs are joined by a continuous curve from which the shaft is slightly cut away, as though to suggest a separate point set on a shaft; a line of very small drilled dots follows the curve of the barb guide line, as a decorative element; and on the opposite face there is a sunken bed for the stem of a point. This bed would accommodate a U-shaped stem, but a squared-off indentation within the larger bed may indicate preparation for attaching a square-stemmed point. Perhaps it is not mere coincidence that allows a particular flaked point (Fig. 9,

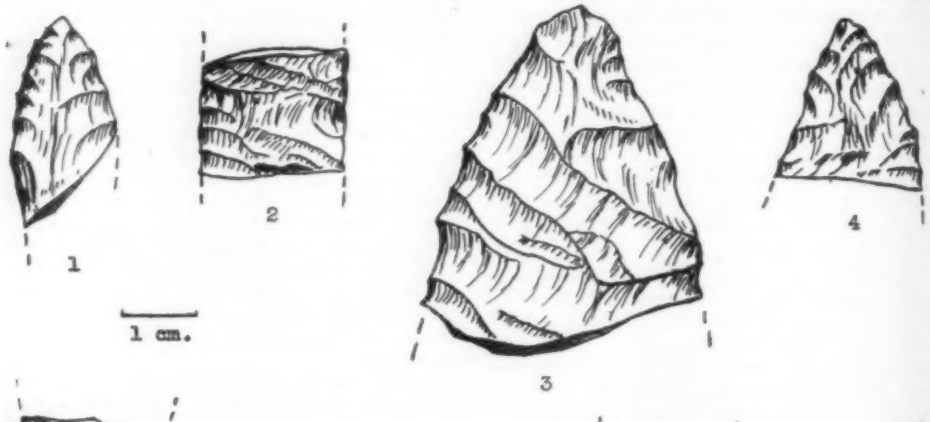

Fig. 9. Projectile points and fragments.

13) to fit this bed. Provision for fixing the point to the head is indicated by a lashing groove around the illustrated face. A recent whaling head pictured by Murdoch (1892, Fig. 212)shows a flint point lashed in this manner.

The very thin antler specimen illustrated in Figure 6, 8, appears to be an unfinished harpoon head of another type.

Harpoon Dart Head. A thin harpoon dart head of antler (Fig. 4, *4*) has 2 barbs on one side and one on the other. A line hole is drilled from both sides. The rounding of the barb and tip, and the over-all shape, bring to mind a specific dart head from Norton culture rather than the harpoon dart heads of this *general* nature that are common to many late Arctic sites. This form of dart head, associated with the recent use of a bladder dart, seems to be absent in Ipiutak and the early St. Lawrence Island cultures, though it is an element of Dorset and early southern Alaska cultures (de Laguna 1947: 199).

Harpoon Point (?). The stone point discussed in connection with the barbed form of harpoon head (Fig. 9, *13*) is a very thin (2.5 mm.) specimen of silicified slate with a triangular body over a square stem.

Harpoon Foreshaft. Two possible foreshafts of ivory resemble in their quadrangular cross sections specimens from Norton culture and from Ipiutak (Larsen and Rainey 1948, Pls. 6, *2-3*; 38), though they lack provision for line attachment.

Arrow (or Spear) Head. Three objects of antler (Fig. 6, *2-4*) appear to be either blunt arrowheads with bifurcated stems, or the cut-down parts of such objects. Each appears to have been cut at the blunt end rather than simply broken, but this could have been done after the objects had served as heads of a different kind. Again, if these were once doubly pointed, the "bifurcated stems" might turn out to be the blade slots of the distal ends of arrowheads. Some Near Ipiutak arrowheads had split stems like these (Larsen and Rainey 1948, Pl. 78, *12-14*). If it has been cut down, Figure 6, 4 may represent this type, but the thicker specimen, Figure 6, 3, reminds one more of the objects slotted at both ends from the lower levels of the Trail Creek caves (Larsen 1951, Figs. 5, 14).

Projectile Point or Knife. Fourteen flint points and fragments are illustrated to show the range of styles in flint work, and 11 more fragments seem to fall within this class. A black chert point serrated about the edge (Fig. 8, 3) takes the outline of certain points of Norton and Near Ipiutak culture (Larsen and Rainey 1948, Pl. 80, *15-17, 21-4*). It is presumably an arrowpoint. Another black chert point, Figure 8, *7*, is almost identical in form, though somewhat smaller than a point from the Denbigh Flint complex (Giddings 1951, Fig. 60b, *1*). Both have squared stems very slightly indented. The Choris specimen is diagonally flaked on both faces.

A smaller, diagonally flaked biface of gray chert (Fig. 8, *2*) has a straight base, and is slightly asymmetrical, suggesting a knife blade rather than an arrowpoint.

Two fragments are those of large diagonally flaked points. A chert specimen (Fig. 9, *2*) has parallel edges and closely resembles in width and thickness a specimen from the Denbigh Flint complex (Giddings 1951, Fig. 60a, 3) and another from a purchase collection from Kotzebue (Giddings 1948). The other (Fig. 9, *5*) is a basal section of light brown chert with ground edges. The base is concave as a result of thinning on both faces and the point widens away from the base. Large diagonally flaked points similar to these in range of form and technique have recently shown up in the Trail Creek caves (Larsen 1951, Fig. 14), in lower levels of MacNeish's Firth River site (MacNeish 1956, Pl. 1, *3-7*), and in a Brooks Range site discovered in 1956 by John Campbell. It is clear, however, that the diagonally flaked blade was not short lived in this part of the Arctic, and that a local typology will be needed rather than an assumption of identity with similar flints found far to the south.

Two bases of chert points (Fig. 9, *8, 9*) are also diagonally flaked and ground at the edges, but they differ from the preceding in having a slightly constricted stem. Two other stem fragments are too short for further typing. Figure 9, 6, of black chert, has been basally thinned in long, narrow spalls on both faces. Figure 9, *7*, of chert, shows on one face a wide flake scar suggestive of fluting, but this scar results from a blow struck in the opposite direction from the base, as the ripple marks indicate.

Three basal fragments of fairly large points are of forms with well-developed stems. Two diagonally flaked specimens of chert (Fig. 9, *10, 11*) are ground at the edges of the stem. The other (Fig. 9, *12*), of black chert, is square-stemmed, and shows diagonal flaking on one face, but is not edge ground.

The tip of a large chert biface (Fig. 9, 3) and 2 fragments, one of chert and one of black chert, probably were stemmed spear points like those made until recently along the western coast of Alaska (Nelson 1899, Pl. 57, 3, 6).

Miscellaneous. A fragment of ornamented strip of antler may be part of a brow band. One edge is scalloped, and a pair of grooves runs longitudinally along one face.

A thin antler handle (Fig. 4, *1*) flattens toward the ends from an oval cross section at the center, and has a drilled hole in either end. A reinforcement shaft of antler has the 2 ends of one face planed off, evidently for bracing a slightly bowed surface. A cut-off section of animal rib 40 mm. long is evidently the blank for some object.

An ornamented ivory fragment (Fig. 4, *5*) is reminiscent of Old Bering Sea in the use of deeply drilled dots joined by freehand engraved lines. The decoration consists of 2 pits about 3 mm. deep; and part of a third pit at the point of ragged break. Between the broken pit and each of the others stretches a very fine pair of engraved lines — perhaps drawn in one motion with a double pointed engraving tool.

The sandstone fragment shown in 2 views (Fig. 5, *4*) may have had 2 "wings," to judge from a break along the upper margin, but we have no clue as to its identity.

Several worked antler fragments include a short section of antler scored about the whole periphery, as though for binding.

The forms and techniques to be seen in the contents of the house refer the Choris site strongly toward Norton culture of the northern Bering Sea. The Norton culture, defined from our excavations in the so-called "middle levels" at Cape Denbigh and elsewhere about Norton Sound, dates from some time earlier than 2500 years ago to as late as 1500 years ago, as shown by radiocarbon dates, most of which are not yet published.

The Choris house has the following traits in common with early Norton culture: linear-stamped pottery; crude and scarce slate blades heavily striated by scraping with flint scrapers before edging as ulus; grooved stone shaft smoothers and pointers, pumice polishers, wedges, drill bearings, flaker tips and flaker hammers, stone slab knives, punches of antler, scapula scrapers, flake scrapers, a harpoon dart head, a foreshaft, and an ice pick; two forms of small projectile point; and a unifaced form that we call a flakeknife.

Lacking, on the other hand, are the following forms very common in Norton sites: polishing of hard stone, including adz blades of silicified slate; net sinkers, side blades, discoidal scrapers, shaft smoothers, oval lamps, and stone dishes; slate drill bits; and pottery which is sand tempered and check stamped. The house with rectangular floor plan and passageway might also be added.

A few traits point inland along neighboring rivers: the crude but distinctive form of stone lamp; the probable sweat bath hut; the scapula scraper with vane removed (and used by recent Eskimos as a fish scaler); and the caribou antler paddle scoop.

Some traits not known from Norton culture, nor from any of the recognized aspects of culture later than Norton in northern Alaska, but closely resembling those of the Denbigh Flint complex, are the following: large blades such as must have been produced from a prepared core (here used in knives and scrapers); unifaced flakeknives; diagonal flaking expertly applied to medium-sized or large bifaced projectile points or knives; and burins. The burins — two of them — are unlike any precise form of the Denbigh Flint complex, and are, instead, an unhafted burin bec-de flute more like forms known from the Old World. Burins are not known from the Norton culture nor from any of the later sites of western Alaska, though they appear in various forms in early horizons in inland Alaska, Canada, and Greenland (Giddings 1956: 265-6).

The Choris artifacts are much closer typologically to Norton forms than to those of the Denbigh Flint complex. They do not share the

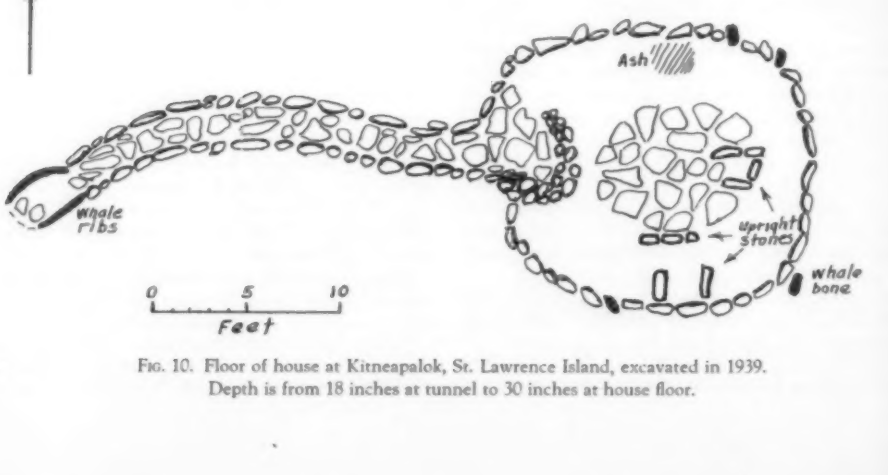

FIG. 10. Floor of house at Kitneapalok, St. Lawrence Island, excavated in 1939. Depth is from 18 inches at tunnel to 30 inches at house floor.

following traits with the latter: minute retouching of microblades, nor the microblade itself; diagonally flaked side blades; double-pointed arrowpoints; concave-based "harpoon blades"; channeled scrapers; small end scrapers; and many other particulars of technique and form.

Traits at Choris that are not quite like others in the Bering Strait region are: an oval dwelling of large size; a triangular form of flint blade very evenly flaked over the broad cutting edge, and presumably fitted into both adz heads of antler and antler handles of a new type; a large adz head of antler provided with a half round slot which penetrates the head halfway from one side, providing for a handle; 2 whole, and several fragmentary projectile points of flinty material that are reminiscent of early forms from the western plains; and a form of barbed harpoon head apparently designed to hold a stemmed flint point. Bone counts show a far heavier emphasis on caribou hunting than do other Alaska sites for which adequate bone counts are available.

It would be difficult to place the Choris house in time between Norton culture and any of the later assemblages of northern Alaska. Certain resemblances to undated flints from Larsen's Trail Creek caves, not far away on Seward Peninsula, are worth noting, and it is likely that when more work is done at Choris we shall find that these 2 sites represent a transition period when pottery and slate were beginning to take hold in the region. The sequences developing at Firth River (MacNeish 1956) will aid in the cross dating.

The chances are that the root-laden wood fibers and the few bits of charcoal brought back for radiocarbon dating are not pure enough to give us a definitive date even if they are accepted for processing. A tentative dating for the Choris house on crosscultural grounds is between 3000 and 4000 years ago. In any event, this house is a clear candidate for the earliest house ruin in the Bering Strait region, probably excepting a far-inland floor outline recently described in manuscript by William N. Irving (1954), and as such its form has theoretical implications of some interest. The nearest comparable round or elliptical pit houses in America appear to be far to the south and east, in southern Canada and the United States. The round or pear-shaped house outlines of the eastern Arctic all seem to have well-developed passageways, and to differ from the Choris house in size, materials used, and method of roof support; yet it seems legitimate to reopen the old questions of possible origin of the Thule house in Alaska and Asia.

A search for antecedents to the Choris house would take us either into the more distant past of the Bering Strait region or to the clues to be found in houses of any period across the strait in the northeast of Asia. There seems to have been no pit house excavation as early as the Okvik-Old Bering Sea (or Okvik-Uelen)stage on the mainland of Asia (Chard 1955: 168), although Rudenko alludes to stone-paved floors above ground, or very slightly depressed, in this period (in a translation by Paul Tolstoy, transmitted in part by James A. Ford). Many recent houses along the Eskimo-Chukchee coast have had rounded floor outlines, but this has conformed mainly to stone and whalebone construction. On St. Lawrence Island 2 round houses are known — both excavated by the author in 1939. The later of the two was one of several apparently round houses at a site called Kitneapalok, 20 miles south of Gambell, where the author was the first to carry out complete excavations.

The Kitneapalok house was of the Thule, or Late Punuk, stage of culture, and its walls had been of stones and whale bones. Almost perfectly round in floor plan except for a peculiar entrance partition, this house (Fig. 10) had been flagstoned in its center floor and throughout a 30-foot passageway.

The second house, described by Rainey (1941: 468-72), is the Okvik culture ruin at Gambell for which we have a radiocarbon date of about 2300 years before present (Johnson 1951: 15, Sample No. 505). This may be the oldest excavated house in the greater Bering Strait region next to that of Choris; hence it is interesting to note the essential roundness of its floor outline, one side of which had been partly erased by rock slides.

The largest body of houses yet excavated in the west is that of Ipiutak culture, and they are all rectangular. Even though 2 Ipiutak radiocarbon dates have turned out surprisingly recent, it is doubtful that any of us believes that this remarkable flint culture could have sprung up among the staid "Eskimo" types of culture as late as a thousand years ago. Its roots must be earlier somewhere, and among those roots we should expect to find square structures. It is intriguing, however, to learn that the earliest people of St. Lawrence Island, on the other side

of the strait, may have preferred round houses to those with corners, and that at later times on the island round houses occasionally appeared among the square ones. St. Lawrence Island is not American, despite the accident of its belonging to the United States, but an island off the Asian coast south of the easily crossable Bering Strait. Hence round pit houses there are but a guarantee that they did exist along the Asiatic coast in a cultural period for which they have not yet been identified on the mainland. The Choris house is unlike both of the St. Lawrence houses in nearly all respects but that of its rounded outline, and we can only wait and see whether or not the wild guesses of earlier theorists that round pit houses entered the New World ahead of square ones can be borne out archaeologically.

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ANCIENT MESOAMERICAN MORTARS, PLASTERS, AND STUCCOS: COMALCALCO, PART I

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THE USE of lime mortar in the New World appears to be confined to the area of Mesoamerica. It is, in fact, one of the most important of the several traits charatceristic of this area which have given rise to the concept of Mesoamerica as a distinct cultural unit. The extensive use of lime mortar within Mesoamerica probably played a significant role in the development of more advanced forms of architecture within this area than in other parts of the New World, especially since it was employed ornamentally as well as functionally.

On the assumption that the use of lime in the form of mortar as a building material is a Mesoamerican invention, such an invention plus the development of its varied uses represents a complex technical achievement about which very little is known. The present paper is the initial one in a series dealing with mortars and similar building elements of Mesoamerica. It is hoped ultimately to describe and characterize the techniques of the major cultural groups and possibly to provide evidence of the diffusion of knowledge within and between them.

The reports of archaeological investigations at ancient Mexican sites frequently refer to mortars, plasters, or stuccos used in the building of the structures. Beyond such observations little or no attention has been paid to the technical aspects of these building elements. The available information on Mexican mortars, plasters, or stuccos appears to be quite scarce and has been reported, in general, incidentally to other investigations. Morris, Charlot, and Morris (1931, Vol. 1: 220-4) report that lime mortar was made with the juice of the chocom (chucum) tree (*Agave ixtli, Agave silvestris*, or *Pithicolobium albicans*), and E. H. Thompson (1932: 174) records the use of sascab in place of sand in making mortar. (Sascab is an unconsolidated form of calcium carbonate found in pockets in limestone.) J. E. S. Thompson (1954: 75)

describes briefly the use of adobe for the construction of pyramids and of a facing of pumice set in mud. The use of sascab is also reported by E. H. Thompson (1897: 18) and Villa R. (1934). Of the few references found on this subject, only two refer to actual compositions of the mortar or plaster. Ruppert, Thompson, and Proskouriakoff (1955: 67) state there was no evidence of the use of sand or ground limestone in the mortar at Bonampak. Foster (1935: 577), however, presents the chemical analysis of a mortar from the Monjas Complex at Chichén Itzá. Of itself, this analysis gives no clue as to the original composition of the mortar or the technique used in its manufacture.

Since current practices are often based on traditional methods, clues were sought to ancient procedures by questioning workmen engaged in restoration work under the direction of Alberto Ruz L. at Uxmal. These men stated that honey was traditionally mixed with mortar and plaster. They further reported that an extract of chucum bark is still used to wet plaster before troweling, a procedure also reported by J. E. S. Thompson (1954: 75). Similar questioning at Chichén Itzá led to the statement that in the smaller villages an extract of the bark of the chacte tree (*Caesalpinia platyloba*) is still mixed with plaster to give added strength. Since mortars, plasters, and stuccos are actually elements of construction, it appeared that their systematic examination might throw some light on ancient building techniques.

In order to study ancient mortars, plasters, and stuccos, it is necessary first to define the terms which will be used throughout this investigation. The definitions are based upon the probable function of the material and those given below will be used until better ones are developed.

Mortar. A bonding material, usually found between courses of stone or brick, as a matrix for loose stones, or as a leveling coat on the outside of the mass where it is used as a base for decorative or protective plaster. It is often soft, white or gray, and generally has a limey appearance. It may also contain an aggregate, such as sand, earth, ground stone, or sascab, and shell or limestone fragments. Mortar as used in this paper is comparable to the term cement used in earlier descriptions.

Plaster. An essentially flat, external coat over a monolithic mass, used primarily as a protective medium or as a surface for mural painting. It is often denser than mortar and contains less visible and smaller shell or limestone fragments. Plaster may also contain an aggregate.

Stucco. A cast or modeled surface used solely for decorative or symbolic purposes, generally similar to plaster in density and appearance.

Lime-aggregate. A mixture of lime and aggregate or grit used in the erection of a monolithic mass without the use of brick or stone. When damp, it may have the appearance of packed earth. When dry, it is generally harder than packed earth with little or no tendency to crumble in the hand. This material is described later; it was used in the earlier, nonbrick structures at Comalcalco.

Wash Coat. A coat of plaster which, because of its thinness, was probably applied by means other than troweling. Wash coats may have been applied by brushing on vertical or horizontal surfaces or by pouring a thin slurry of plaster over horizontal surfaces. Such coats are usually less than 1 mm. in thickness.

The structural elements defined above pertain to single layers of material and do not, by themselves, yield information showing their methods of use in building a structure. This information can be obtained only through a study of the profile of the several elements in situ. This point will be illustrated by the results obtained from a study at Comalcalco, described below. The techniques of using the building elements as defined include also the processes by which the materials were made. It is, therefore, the objective of this study to develop the following points as they apply to ancient Mesoamerican structures.

1. Type of building element.
2. Function of each type of element.
3. Composition of each type of element and source of the raw materials, including:
   a. Source of lime.
   b. Type and source of aggregate or grit.
   c. Proportion of lime and aggregate or grit.
   d. Type of organic additive (plant extract) used, if any.

Except for the on-site observations, the approach to the characterization of mortars, plasters, and stuccos will be through chemical and physical examinations which, it is believed, will yield information of sufficient precision to reduce the

amount of speculation required to interpret visual observations alone.

Comalcalco. Through the kindness of G .F. Ekholm, the writer was invited in 1956 to visit the site at Comalcalco, Tabasco, Mexico, where the American Museum of Natural History was conducting extensive investigations. The work reported here concerns only certain phases of the composition and possible uses of several lime-based building elements. Samples of material for examination were obtained from the steps and sanctuary of Temple IV and the Palace. This paper presents the results of on-site and laboratory investigations pertaining to the steps of Temple IV which appeared, upon preliminary examination, to have been constructed of layers of packed earth each of which was covered by a layer of lime plaster. Later additions to the original steps were apparently made by applying packed earth layers and again covering these with plaster.

For the archaeological aspects of the site, the reader is referred to forthcoming publications by Ekholm and his associates. [EDITOR'S NOTE: Brief preliminary accounts of excavations at Comalcalo appear in AMERICAN ANTIQUITY, Vol. 22, No. 2, p. 223, and this issue, p. 218.]

On-Site Observations and Sampling. The newly excavated steps, which were actually a series of superimposed stairways of the prebrick period, were covered with a rather smooth coat of plaster, largely unbroken, which appeared to be a final coat. The sample for analysis was taken from the side of the riser of the bottom step at the point shown in the illustration (Fig. 1). An attempt was made to remove a rectangular plug about 5 by 5 cm. in size in a direction parallel with the face of the step by careful cutting with a knife blade. As the cutting progressed, it was found impossible to obtain a complete plug or profile of the construction because of a tendency of the damp mass to crumble. Instead, each layer of apparently different composition was separated, where possible, and its position noted with reference to the outside or plaster layer referred to above. All of the sections removed were quite damp, a condition which proved to be most fortunate since the demarkation between sections was readily discernable. It was found later that the colors of the separate sections were so nearly alike when dry that their presence could be easily overlooked.

The profile cutting was continued until no further separations or layers appeared or to a depth of about 15 cm. In terms of functional classification of the building element, described earlier, the following sequence of layers was observed, starting from the outside.

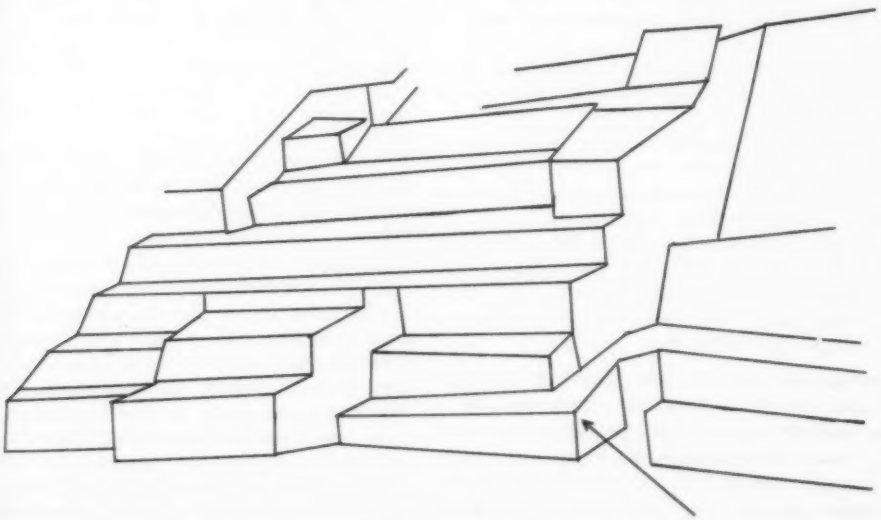

FIG. 1. Area of sampling (arrow) of prebrick period of steps of Temple IV, Comalcalco.

	Sample No.
Wash coat	—
Lime-aggregate	1
Plaster	2
Wash coat	3
Lime-aggregate	4
Plaster	5
Wash coat	—
Lime-aggregate	6
Plaster	7
Wash coat	8, 9
Plaster	10

The numbers opposite the layers are those assigned the analytical samples which are described in detail as follows:

Sample No. 1. Lime-aggregate containing shell fragments which were largely removed before chemical analysis. The wash coat was so thin and fragile it could not be removed even when the sample was soaked in water. The sample for chemical analysis excluded the wash coat.

Sample No. 2. Plaster containing a rather large amount of shell and carbonized wood. Not all the shell could be removed.

Sample No. 3. Wash coat showing no evidence of shell or carbonized wood.

Sample No. 4 . Lime-aggregate containing some shell, but in smaller amount than No. 1. The cement also appeared softer than No. 1.

Sample No. 5. Plaster containing shell, similar to No. 2.

Sample No. 6. Lime-aggregate containing some shell. The wash coat could not be separated and was excluded from the analysis.

Sample No. 7. Plaster containing a large amount of shell and some carbonized wood. Similar to No. 2.

Sample No. 8. Wash coat showing no evidence of shell.

Sample No. 9. Wash coat containing a small amount of shell. Sample No. 8 may have been a "finish" coat over No. 9 as lamination was quite evident.

Sample No. 10. Plaster containing some shell, part of which was in rather large pieces.

Further examination of the profile of the steps showed that the several layer thicknesses were not uniform. In general the lime aggregates were 2 to 5 cm. thick whereas the wash coats covering them were 0.5 to 1.0 mm. in thickness. Plasters appeared to be of the same thickness as the cements though this may not be a general situation.

Laboratory Analyses. From consideration of the objectives of this investigation, it is believed that adequate information relative to the compositions, sources, and possible function of the lime-based building element can be obtained by analyses for calcium, magnesium, and the material insoluble in hydrochloric acid and the identification of the insoluble material. For this work, calcium and magnesium were determined volumetrically by titration with a standard Versene solution. The acid insoluble material was that which was insoluble in 10% HCl. Identification of the acid insoluble material was made by infrared and microscopic examination. For those interested in the detailed techniques, the methods will be provided by the writer, upon inquiry.

The results of the analyses are shown in Table 1, in which dashes indicate those layers which could not be clearly separated.

TABLE 1. ANALYTICAL RESULTS, TEMPLE IV STEPS, COMALCALCO.

Sample No.	*Description*	*Insoluble %*	*Ca %*	*Mg %*	*Ca/Mg Molar Ratio*
—	Wash coat	—	—	—	—
1	Lime-aggregate	42.0	19.0	0.63	15.1
2	Plaster	17.3	30.7	0.51	36.2
3	Wash coat	13.5	32.1	0.77	25.0
4	Lime-aggregate	66.4	11.6	0.51	13.2
5	Plaster	10.0	33.8	0.38	53.5
—	Wash coat	—	—	—	—
6	Lime-aggregate	58.2	14.0	1.0	8.4
7	Plaster	14.1	32.2	0.52	37.0
8	Wash coat	19.1	30.0	0.38	47.5
9	Wash coat	19.6	29.8	0.90	19.8
10	Plaster	28.2	26.2	0.76	20.6

The acid insoluble material was identified as a mixture of quartz and complex silicates and might be considered representative of a sandy soil.

Discussion of Results. The absence of limestone from the vicinity of the site and the high molar ratios of calcium to magnesium would tend to confirm the use of shell as a source of lime for the construction of the steps. The large amount of acid insoluble material in the lime-aggregates leads to the conclusion that these elements consisted of mixtures of lime and the available sandy soil in the ratio of about equal parts in the latest coat and in the ratio of about 2 parts of soil to one of lime in the earlier ones. With the exception of the earliest plaster (No. 10), the wash coats and

plasters yielded less than 20% acid insoluble material and, with one exception (No. 5), the quantity varied between about 14% and 19%. This relative uniformity suggests that the inclusion of the soil was probably incidental to the gathering of the shell from nearby waters. It would appear from the above that lime-aggregates were made by the deliberate addition of an aggregate in the form of sandy soil while the plasters and wash coats were made from shell alone, albeit contaminated.

The use of an aggregate with lime to form a strong monolithic mass was not evident during the collection of the sample since the lime-aggregates were damp and soft and appeared to be only packed earth. When, however, the lime-aggregates are dry, they are quite hard and would be capable of sustaining heavy weights. They would also be self-supporting, even in thick sections. It may be noted that the use of aggregate with either lime or Portland Cement is accepted practice today in the preparation of mortars and load-bearing monolithic masses.

A study of the sequence of layers as observed while collecting the sample reveals a repetitive type of element construction as shown by the dotted lines. If we assume that the earliest plaster could have been a lime-aggregate, we then find 3 complete units of construction consisting of lime-aggregate, wash coat, and plaster, applied in the same order. If the lime-aggregate-wash coat sequence only is considered, it will be seen that the pattern is repeated 4 times. The repetition of this pattern over the entire period of use of Temple IV could hardly be accidental. The use of the term "unit type of construction" is not intended to imply that the steps were originally constructed in their entirety as found. It is more probable that successive reconstructions were made by applying the unit of lime-aggregate, wash coat, and plaster, and that the lime-aggregate was an "economical" form of bulk. The addition of a large amount of aggregate to the lime-aggregates, by the same reasoning, also bespeaks a deliberate action. The effect of water on lime-aggregates to rapidly cause their softening and collapse and the resistance of a nonporous coating such as a shell-free wash coat, which, because of its thinness dried rapidly, must also have been observed. In the light of the information presented, it appears that the builders of the steps of Temple IV had used a unit of construction well adapted to the local climatic conditions and capable of carrying heavy loads and that this unit consisted of a lime-aggregate protected by a thin coat of relatively impervious plaster which, in turn, was covered by a heavier and more porous plaster, possibly added for decoration, to obtain symmetry, or for additional protection.

The possibility exists that the type of construction described above may be typical of an area extending beyond the immediate confines of Comalcalco. Ekholm (1944: 386) in describing Mound A at Los Flores, Tampico, reports a structure strongly suggestive of the same type of construction as the steps of Temple IV at Comalcalco as may be seen from the following:

> A structure was covered with a single thin shell of plaster which, as the earthen core settled, must have cracked up very soon after it was finished. . . . Also, new layers were superimposed on the old in a curious manner. Always, except in the case of one floor, a layer of earth was put over the older building before a new one was applied.

If the types of construction at Los Flores and Comalcalco are indeed similar or identical, a second use of this type will have been added to the one report by Ekholm.

Acknowledgement. The author expresses his sincere thanks to Alberto Ruz L. for the many kindnesses extended and to G. F. Ekholm for his counsel and assistance in the preparation of this paper and in particular for his encouragement of this study.

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WESTFIELD, NEW JERSEY
December, 1956

THE CERAMIC POSITION OF PALENQUE, CHIAPAS

ROBERT L. AND BARBARA C. RANDS

ALTHOUGH the site of Palenque, Chiapas, has long been one of the most famous of Maya ruins, its pottery has until recently remained virtually unknown. Aided by a grant from the Wenner-Gren Foundation for Anthropological Research and with the cooperation of the Institute of Andean Research, the writers conducted ceramic excavations at Palenque in the summer of 1951. With the assistance of a John Simon Guggenheim Memorial Foundation Fellowship, the senior author in 1956 made additional stratigraphic excavations at Palenque, as well as conducting a brief ceramic survey at nearby sites in Chiapas and Tabasco. Both seasons of work were in close collaboration with archaeologists of the Instituto Nacional de Antropología e Historia of Mexico, who kindly placed at our disposal large quantities of ceramics which were obtained in the course of their primarily architectural investigations during the 1951-1956 seasons. Material assistance of the Instituto in carrying out the field investigations is also gratefully acknowledged.*

* The cooperation of the director of the Palenque project, Alberto Ruz L., has taken numerous forms in making our work possible. It is impossible here to give adequate thanks to the many persons who have aided us in the study, but we wish especially to acknowledge unpublished information provided by the late George W. Brainerd, University of California at Los Angeles, and Linton Satterthwaite, Jr., The University Museum, Philadelphia. We have profited greatly by discussions with Robert E. Smith and Edwin M. Shook of the Carnegie Institution of Washington, and Gordon F. Ekholm, American Museum of Natural History. A special debt of gratitude is owed Robert H. Shaver of the Department of Geology, University of Mississippi, whose patient cooperation has given us technological insights which must otherwise have been lacking.

The best studied of the pottery is that associated with the Temple of the Inscriptions (B. C. Rands 1954), the structure made so prominent in recent years by the discovery of the elaborate tomb chamber within the pyramid (Ruz 1955). In addition, a brief statement of major conclusions from the first season's work has been published (Ruz L. 1952c: 60-3). The present paper deals not so much with a general survey of Palenque pottery as with the site's ceramic relationships. It is recognized that final study of the collections may modify some of the conclusions, still preliminary in nature, which are presented herein. However, the generalized nature of certain correspondences which are cited — the frequent comparison of broad ceramic trends or isolated modes rather than of integrated types — is due primarily to the fact that the pottery of Palenque differs markedly from that of better known localities in the Maya area. Survey has shown that even a scant 20 miles from the site the apparently contemporaneous ceramic assemblage has undergone a pronounced and quite surprising change.

Certain factors, peculiar to Palenque, emphasize the need for ceramic knowledge of the site. The absence of a series of inscribed stelae and the complexity of inscriptions on wall tablets present problems for dating in the Maya calendar. In general, the available dates cluster around 9.10. to 9.13. (in the 7th century A.D. in the Goodman-Martínez Hernández-Thompson correlation); although readings have been given from as early as 9.5. to as late as 9.18., thus spanning much of the Late Classic period (Morley 1937: 370-1; Ruz L. 1952a; 1952b: 41-2; 1955). Moreover, until the recent work of Berlin (1956), Armillas, and Ekholm in Tabasco, Palenque was in terra incognita so far as any

systematic ceramic investigations were concerned. The peripheral position of Palenque, well toward the westerly reaches of the Maya area, must be emphasized.

The location of the site, in the first limestone foothills that rise steeply from the alluvial Tabasco-Chiapas plain, is of particular interest. We wish not only to call attention to Palenque's strategic position so far as "highland" versus "lowland" spheres are concerned but to comment upon tempering materials present in the pottery at this site. In general, Maya Indians living in limestone country tended to use a great deal of crushed limestone (calcite) for temper. This material was not present in the alluvial Tabasco lowlands; hence the available resources of sand were used. Both limestone and sand were readily available to the potters of Palenque, and both were utilized. However, there is a definite temporal patterning to this. In the earliest deposits we have uncovered, both calcite and quartz were present as temper, in approximately equal amounts, depending on the pottery type. But steadily the choice of quartz temper gained in ascendency, until in the latest levels calcite had almost died out. Preliminary inspection of pottery excavated stratigraphically at Chinikihá, Chiapas, suggests that a corresponding shift in tempering materials took place at that site. Lying 25 miles to the east of Palenque, Chinikihá occupies a generally similar position in the sierras, close to the Tabasco plains. In the change from calcite to quartz temper we tend to see a movement away from typical Maya patterns to ones which were more characteristic of the peripheral Tabasco region. Additional examples of this shift appear in other aspects of the Palenque and perhaps the Chinikihá ceramics.

The earliest pottery recovered at Palenque is characterized by other features than the relative abundance of calcite temper. Polychrome, while never abundant, occurs much more frequently in early deposits than it does thereafter; by late times painting of any sort has largely disappeared. Red-and-black-on-orange is a favored combination. Painted designs are geometric, not a single example of typically Mayan figure painting as yet being found.

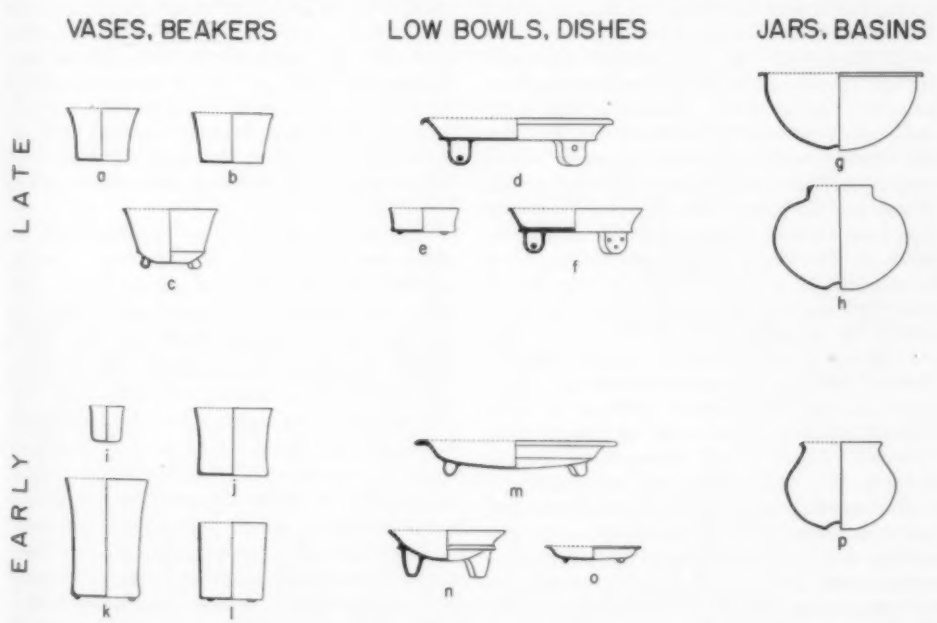

FIG. 1. Changes in basic Palenque vessel forms. Typical range: *a-c*, red-brown (self-slipped or polished), black, Fine Gray; *d-f*, red-brown, black; *g*, *h*, unslipped (quartz tempered); *i-l*, red-brown, cream slip, polychrome, stucco painted; *m-o*, red-brown, cream slip, orange slip, polychrome; *p*, unslipped (calcite tempered). Approximate scale 1:9. Some forms partly reconstructed.

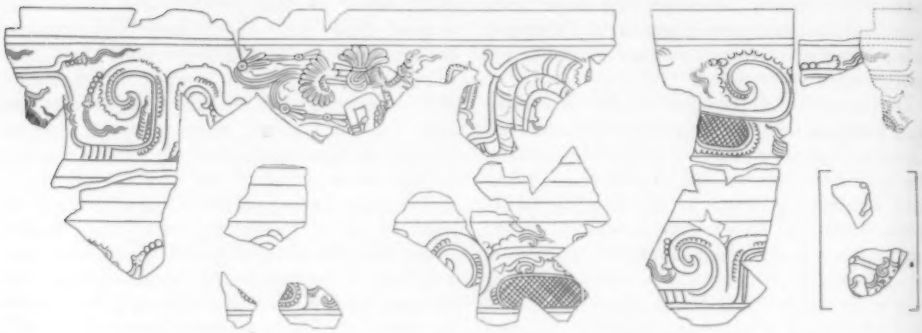

FIG. 2. Red-brown cylindrical vase. Incised horizontal panels are separated by medial fluting. (Drawing courtesy of Avis Tulloch, Carnegie Institution of Washington.)

The replacement of geometric polychrome by monochrome wares follows a trend which, in the Petén, characterizes the change from the Tepeu 2 to Tepeu 3 horizon (Smith 1955: 6). The shift at Palenque from a relative abundance of painted to unpainted pottery is likewise duplicated at comparatively nearby sites. At Yoxihá, in the mountains 20 miles to the south, Blom and La Farge (1926: 233) found 2 superimposed tomb chambers, the earliest of which contained numerous painted and polychrome vessels. Painting was completely absent from the upper tomb, however. The lower tomb has a generally Tzakol flavor, including basal-flange and composite-silhouette bowls with typically Petén bird and rectilinear designs (Blom and La Farge 1926, Fig. 191, Pl. 4). At Tecolpan, in the Chiapas plains 30 miles to the north of Palenque, recent excavations show polychrome pottery of so-called "Classic Maya" type confined to the lowest levels, being replaced by unpainted wares. The Tecolpan polychrome is said mostly to correspond to a Tepeu 2 horizon, although a few Early Classic types are present (Berlin 1956: 123, 131). Twenty miles to the north of Palenque at Trinidad, Tabasco, our excavations likewise indicated the replacement of polychrome by predominantly monochrome wares. This trend, however, seems to be in the nature of a generalized drift; strict equation of the polychrome and unpainted types of Palenque with those of the other areas has only occasionally proved possible.

Another transition at Palenque is from service pottery having contrasting slip to self-slipped, polished, or smudged wares. Actually, the use of contrasting slips is always rare at the site, but their decline is definite. Slips in the early period are orange or cream; some tendency is shown for the former to be associated with calcite-tempered and the latter with quartz-tempered pottery. While orange slips sometimes attain the lustrous finish that has given rise to the term "gloss ware" in the Petén (Smith 1955: 27), the Palenque slips are characteristically soft and matte. The secondary role accorded slipping at Palenque, at least during the major portion of the occupation, is in contrast to such comparatively nearby Usumacinta sites as Piedras Negras and Trinidad (60 and 20 miles away, respectively), where Petén-like patterns were more closely followed.

Changes in the incidence of vessel form are observable in Palenque pottery. The more significant of these are indicated in Figure 1 for vases and beakers, low bowls and dishes, and jars and basins. For the most part, the vessels which are shown are standard ones at Palenque, exotic pieces being excluded unless their stratigraphic position gives them strong diagnostic value for dating purposes. This would be true, for example, of the basal-flanged bowl (Fig. 1 *n*), an extremely rare form in the ceramic materials which have been uncovered at Palenque. The polar arrangement of basic vessel forms into "early" and "late" categories is not intended to imply the existence of 2 perfectly defined horizons. For the most part, the specific forms are not entirely confined to the temporal position for which they are shown. Only general trends are indicated.

In the finest pottery, cylindrical vases (Fig. 1 *i-l*) are in part superseded by outflaring or outcurved bowls or beakers (Fig. 1 *a-c*). Bases are flat, small tripod feet sometimes occurring. The dominant ware in both forms is red-brown, without contrasting slip, but important associations exist of polychrome with the cylindrical vases and of black ware with the beakers. The basal-break bowl (Fig. 1 *c*) is largely restricted to Fine Gray ware. A number of plastic techniques occur as decoration, incision being present both on cylinders (Fig. 2) and beakers (Fig. 3 *a-c*). Cylindrical vases are occasionally combed (Fig. 4 *g-i*). Vertical grooving (Fig. 4 *a-e, j*) and dentate stamping (Fig. 3 *a-c*) occur particularly on the later forms. But the incidence of undecorated vessels in these "finer" forms is striking throughout the Palenque occupation.

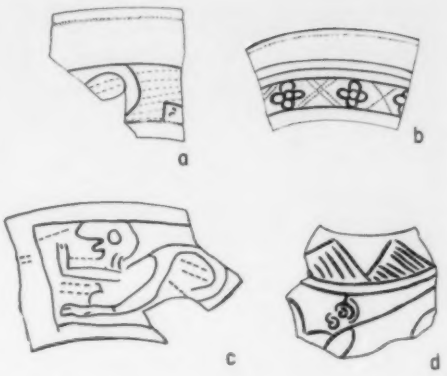

FIG. 3. Beaker and jar designs. *a-c*, dentate stamping combined with incising; *c, d*, monkeys or lemurs. Only *a* is Fine Gray, but the design complex is characteristic of this ware.

Within the sequence of low tripod bowls and dishes, the basal-flanged and convex-based forms (Fig. 1 *m-o*) are diagnostic of an early horizon, the flat-based forms (Fig. 1 *d-f*), often with bulbous cascabel feet, of a later one. A generally similar trend exists elsewhere, for example at Uaxactún, where flaring-sided dishes with flat base and hollow feet achieve some prominence in Tepeu 2 and 3 (Smith 1955, Chart 1, Types 48, 52, 97, 109, 110, 126, 127, 133). Not shown in Figure 1, ring-base bowls occur early at Palenque, a position consistent with their normal Tzakol date at Uaxactún and their presence in the lower but not the upper tomb chamber at Yoxihá (Smith 1955; Blom and La Farge 1926: 233). Flat, widely everted rims are an early feature on the dishes of Palenque (Fig. 1 *m, o*), being in part superseded by hanging rims (Fig. 1 *d*). A basal ridge or fillet (similar to certain examples of the "Z-angle") occurs abundantly at Palenque on the late flat-based tripods (Fig. 1 *d-f*). Although it differs in being unnotched, this feature compares closely in profile with the basal treatment of certain tripods dating from the terminal Late Classic Tepeu 3-Benque Viejo 4-San José 5 horizons (Smith 1955, Fig. 51 *d, l*; Thompson 1940, Fig. 47 *a, e, i, j*; Thompson 1939, Fig. 80 *c*). In the Jonuta horizon of Tabasco the basal ridge, like that of Palenque, seems usually to be without notches or other segmentation (Berlin 1956, Fig. 4 *w, x*). The most common ware for the low bowls and dishes at Palenque is red-brown, with polychrome or slipped examples also having some importance in the early horizon and black ware in the later levels. Except for thumb-impressed basal filleting (Fig. 5 *b-d*), plastic decoration is rare on low bowls and dishes.

Unslipped storage jars also undergo changes in vessel form. Sloping necks and upward everted rims are characteristic of the earlier examples (Fig. 1 *p*), while later jars often have low vertical necks and more nearly squared shoulders (Fig. 1 *h*). A deep, wide-mouthed basin characterizes the later deposits (Fig. 1 *g*). These changes correlate with a pronounced shift from calcite to quartz temper. Impressed triangles frequently are placed on the shoulders of the earlier, calcite-tempered jars (Fig. 6 *d, g*), forms of this technique persisting on quartz-tempered jars (Fig. 6 *c, f*). Rare on the jars of Uaxactún, the impressed triangle is of Tepeu 1 and 2 date (Smith 1955, Figs. 47 *a*,8, 68 *d*,3, 75 *a*,1).

The use of color as a means of decoration tends to be supplanted by techniques involving alteration of the surface. This is a partial correlate of the decline of polychrome. Fine Gray and black are the most frequently decorated of the unpainted wares. Techniques of incising change, early examples being of broader line. Incised designs characteristic of the later levels are shown in Figure 7, together with examples of the extremely rare plano-relief and modeled carving (Fig. 7 *b, c*). Vertical grooving and combing are among the more prominent decorative techniques (Fig. 4), along with thumb impressing (Figs. 5, 6 *a*), fluting, punctating,

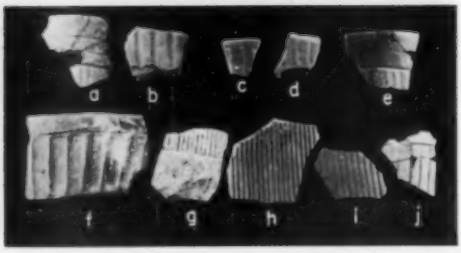

FIG. 4. Vertical grooving (*a-e, j*) and combing (*g-i*). The ribbed appearance of *f* is unusual.

and dentate stamping. Seldom seen on the typical vessel forms, modeling attains a high development on incensarios and figurines. Stucco painting also occurs (Fig. 6 *e*). Its sometimes gaudy color contrasts with the general severity of Palenque pottery, wherein major esthetic value was placed on such factors as vessel shape, thinness of vessel wall, and precision of line.

Other ceramic developments concern the succession of wares at Palenque. As has been indicated, polychrome and slipped pottery are early, tending to disappear in the later levels, and calcite-tempered utility ware is largely replaced by quartz-tempered unslipped pottery. Black ware is known in the early levels, but its rise in popularity correlates roughly with the decline of polychrome. While early examples are sometimes smudged on a single surface, the black ware of Palenque is characterized by the even quality of smudging over the entire vessel. One notable black bowl bears a carved hieroglyphic inscription which probably is to be read as 9.18.7.10.13 (Ruz L. 1952b: 42, Pl. 27). Perhaps somewhat later in the sequence than the rise of smudged pottery, a series of fine paste wares (untempered or virtually untempered) makes its first notable appearance. These include Fine Orange and Fine Gray; in addition, much of the black ware is of a distinctly fine texture. A certain increase in Fine Orange may be noted toward the end of the sequence, but at best it is of rare occurrence in our excavated samples. On the other hand, several X Fine Orange vessels purportedly come from Palenque (Dieseldorff 1933, Fig. 109; Lehmann 1935, Fig. 6; Vaillant 1927, Fig. 385; Brainerd 1941: 180). These specimens, however, are quite unlike the Fine Orange recovered from the excavations. In general, the latter material consists of small, undecorated sherds and is difficult to assign as to exact type; diagnostic features of both X and Z Fine Orange are largely lacking.

Throughout, the dominant ware continues to be a red-brown, oxidized, quartz-tempered pottery, which undergoes comparatively little change in frequency. As has been seen, however, important modifications took place in the vessel forms in which the ware commonly occurred (Fig. 1).

Underscoring the ceramic changes which have been cited, a late pottery complex exists at Palenque which is characterized by distinctive mineral inclusions and associated technological features. Angular particles of an opaque blue to white mineral, perhaps to be identified as chert, occur in some of the quartz-tempered and fine types. The particles contrast sharply with the larger, irregularly shaped fragments of translucent quartz which characterize the sand temper. The blue-white "chert" is uniformly of so minute a size as probably to be considered a natural inclusion in the clay rather than an added tempering material. If so, its significance would be that different deposits of clay were being exploited by the potters who supplied Palenque. These potters, in any event, were introducing new firing techniques, for the

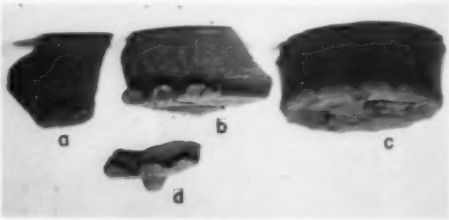

FIG. 5. Thumb-impressed filleting. *a*, medial; *b-d*, basal.

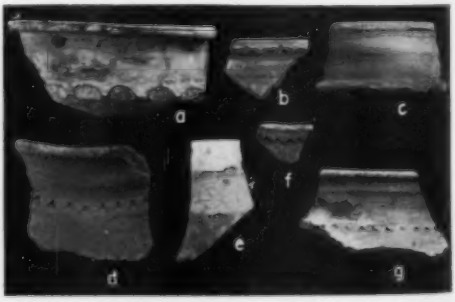

FIG. 6. Design techniques. *a*, thumb-impressed basin; *b*, jar with segmented labial molding; *c, d, f, g*, jars with impressed triangles; *e*, stucco painted cylinder.

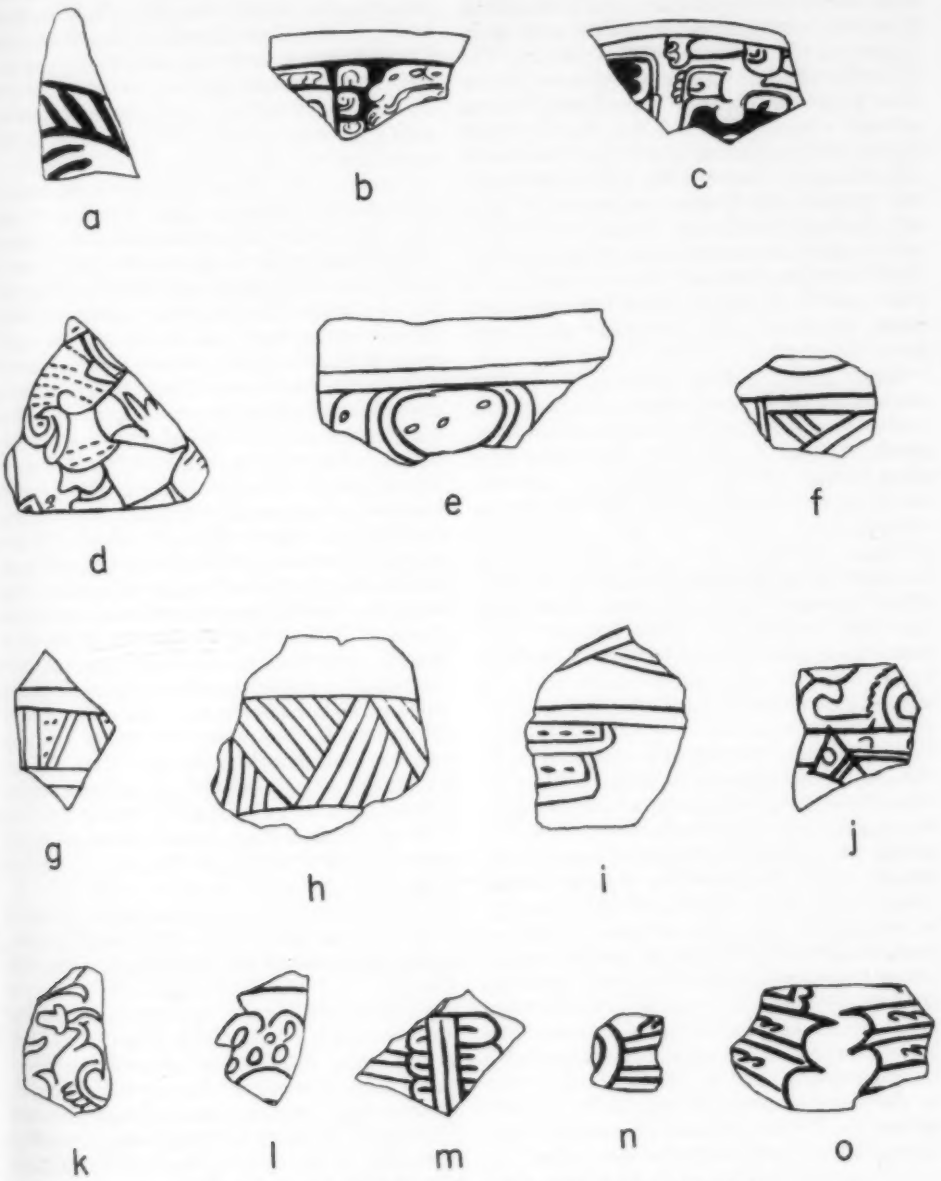

FIG. 7. Decorated sherds, mostly incised. *b*, carved red; *c*, plano-relief, showing head of Long-nosed God.

"chert-bearing" types were distinctive in having wide even cores, in fracture, and in hardness. Moreover, certain shapes and decorative techniques are associated principally with either the "chert-bearing" or "nonchert" pottery. In the later levels, the various "chert-bearing" types average roughly 50% of the sherds. Even should the presence of "chert" inclusions indicate the use of different beds of clay, one would not suppose that so large an amount of pottery, including utilitarian forms, would have been traded in from some truly distant location. Lack of information as to the composition of clay deposits in the Chiapas-Tabasco region vitiates any immediate conclusions along these lines.

Broad developmental trends in the pottery of Palenque have been traced up to this point, comparisons occasionally being made with ceramic changes elsewhere in the Maya area. Some of the material at Palenque suggesting more precise cultural affiliations deserves special comment.

Certain specimens from the oldest deposits as yet found at Palenque correspond to Early Classic norms, but the levels in which they occur do not yield total assemblages of Tzakol type. This may be due to the retention of earlier forms in a peripheral region or to the existence of a fundamentally different ceramic pattern, which set the Palenque area apart from the Petén. Among the earlier forms recovered at Palenque is a single polychrome tripod basal flange (Fig. 1 *n*). Red-and-black(?)-on-orange, this is virtually identical to the orange ware tripod basal-flanged bowls in the earliest Acropolis period at Piedras Negras (Butler 1935, Pl. 8, 37; Cresson 1937, Fig. 16). In addition to slip, close correspondences include pinkish buff paste, calcite temper, beveled rim, and asymmetrical flat-bottomed hollow feet set into the flange. It is true that the basal flange, even when unnotched, is not necessarily Early Classic in date; tripod basal-flange bowls are abundant in the Late-Classic Chipoc phase in the Alta Verapaz (Smith 1952). Nevertheless at Piedras Negras the tripod basal flanges are associated with slab-foot cylindrical tripod vases of generalized Early Classic type. Another feature at Palenque, of which only a single example has been noted, is a gutter spout, again suggestive of the Early Classic (Smith 1955). The tripod dish with gently rounded convex base (Fig. 1 *m*) is comparable to forms which date from Chamá 3 in the Alta Verapaz (Butler 1940, Fig. 22 *f*). In general, we feel that the Early Classic (or beginning Late Classic) is not well represented at Palenque, but on this general horizon certain secure ties do exist with Piedras Negras and, by extension, with the better known Maya cultures farther to the east.

Following an early period of correspondence with Piedras Negras, at least in respect to certain ceramic features, Palenque seems to have diverged markedly from that middle Usumacinta site. Considering the relative proximity of the 2 centers, it has been a source of some surprise to us that correspondences were not closer during the major portion of the sequence. To mention just a few of the differences, polychrome continued to be more abundant at Piedras Negras; negative painting was more important there; utility wares showed heavily scored surfaces as opposed to the very lightly brushed or tool-marked surfaces at Palenque; surface and paste colors at Piedras Negras tended more toward browns and pinkish buffs, lacking the deeper red-brown color that characterizes a great deal of the Palenque ceramics. Features of form and decoration, while occasionally coinciding at the 2 sites, were seldom combined in well-knit, comparable types. Connections with the Petén were still more remote. To exemplify, Palenque's pottery as a whole was not only largely lacking in Early Classic (Tzakol) horizon markers such as basal-flanged bowls and slab-leg cylindrical vases, but Late Classic (Tepeu) diagnostics such as incurved rims and glyph banding were also extremely rare.

Cultural affiliations are sometimes suggested by specific designs. Some more sketchily done rectilinear incisions are reminiscent of the Alta Verapaz, a connection compatible with the prominence of incised monkeys and vertical chevron bands (Smith 1952, Figs. 13 *m*, 15 *a*, *f*, *p*, *q*, *v*, *w*). (Correspondence in quartz-tempered reddish paste constitutes another possible ceramic link between Palenque and the Alta Verapaz.) An atypical black-on-red sherd at Palenque, while not Fine Orange in paste, bears a stylized bird design similar to that characteristic of X Fine Orange pottery (Brainerd 1941, Pls. 1 *e*, 2 *c*). Although again not Fine Orange, an elaborately incised cylindrical vase suggests Z Fine Orange features in showing a reclining human figure in connection with scrollwork

and M-shaped marginal embellishments to the scrolls (Fig. 2). The same vessel resembles one from the upper tomb at Yoxihá in color, shape, incising, thinness of vessel wall, presence of 3 nubbin feet, and, to some extent, division into horizontal zones (Blom and La Farge 1926, Pl. 3).

Of the Palenque pottery which provides comparison with other regions, Fine Gray is in certain respects the most revealing. Unweathered examples of Fine Gray at Palenque tend to be dark surfaced, but in spite of occasionally sharing features of form and decoration with black ware, it remains a highly differentiated type. Common Fine Gray shapes are outcurved basal-break bowls and beakers (Fig. 1 *a-c*). A characteristic Fine Gray decoration is dentate stamping, which often takes the form of diagonal rows as background for incised designs (Fig. 3 *a*). When compared to certain assemblages of Fine Gray ware, such as that found in some coastal Campeche sites or at Comalcalco, the Palenque Fine Gray is distinguished by a number of features. These generally include softer paste, absence of several forms such as jars, absence of gadrooning, absence of broad incision or grooving as rectilinear decoration, and, as stated above, the prominence of dentate stamping and basal-break bowls. While the extent and significance of these divergent trends remains to be determined, the Palenque arrangement of dentate stamping into a row of X-shaped designs, often accompanied by a floral motif (Fig. 3 *b*), stands out as a particularly distinctive feature. The nature of these differences is well exemplified by illustrations of Fine Gray ware at Canpech, Campeche (Ruz L. 1945, Figs. 49, *54-74*; 50, *1-20*). Of these 40 pieces perhaps only three would seem to conform to the Palenque norms of Fine Gray (Ruz L. 1945, Fig. 49, *57-9*).

On the other hand, Fine Gray basal-break bowls do occur at a number of Maya sites. These bowls characteristically have double bottoms containing rattle pellets and are often incised with monkey designs against a background of dentate stamping or occasionally punctations (Berlin 1956: 118-9; Shook 1957). Vessels of this general category occur in the western part of the Yucatán Peninsula (Vaillant 1927, Fig. 287), Tecolpan and Jonuta (Berlin 1956, Fig. 4 *i, m*), Yoxihá (Blom and La Farge 1926, Fig. 189), and Piedras Negras (Cresson 1937, Fig. 1). Double-bottomed rattle bowls and monkey designs are as yet unknown in Fine Gray ware at Palenque. The typical incised monkey, including a background of dentate stamping, does, however, occur in other Palenque pottery types (Fig. 3 *c, d*). In Yucatán, Brainerd places Fine Gray in the Dzibilchaltún horizon, at about 9.14. in the Maya calendar. However Berlin (1956: 119) places Fine Gray toward the end of the Late Classic in Tabasco. The few pieces of Fine Gray from Uaxactún are probably of Tepeu 3 date (Smith 1955: 27, 34). Monkey bowls which almost surely are of Fine Gray paste occur in the upper tomb at Yoxihá, in association with a generally Palenque-like assemblage of vessels. The shift in the stratified Yoxihá tomb chambers from painted composite-silhouette forms with ring base to incised flat-bottomed tripods has already been mentioned. The general sequence at Yoxihá is clear, apparently paralleling that at Palenque rather closely. However, this does not help as much in the precise temporal placement of the Palenque complex of Fine Gray ware and dentate stamping.

Basal-break bowls with monkey designs and dentate stamping also occur at Piedras Negras. Here they are mostly confined to surface deposits in Structure J-12, the latest of 6 definable buildings in the Acropolis. The pottery is largely untempered and shows affinities to Fine Orange and Fine Gray at Palenque. At Piedras Negras, then, a dating toward the close of the Late Classic is strongly suggested for the fine-textured basal-break monkey bowls with dentate stamping. Interestingly, it is only in the earliest and latest Acropolis periods at this site that really close affiliations are to be seen with the pottery of Palenque.

Our 1956 excavations and surface survey in the vicinity of Emiliano Zapata, Tabasco, have indicated additional correspondences with the pottery of Palenque. As well as Fine Gray, fine-textured black and cream provide typological linkages. These have greater frequency in the Zapata area than at Palenque, and the total ceramic assemblages are quite distinct. Of the sites near Zapata, Trinidad is of interest in having a long occupation, perhaps interrupted, from Preclassic times until almost the close of the Late Classic.

In Tabasco, Berlin (1956: 131-2) has recognized a "Jonuta" or Late Classic horizon in which 3 major wares succeed one another: "Classic Maya" (polychrome), black, and Fine

Orange. Fine Gray is seen to have affiliations with the black ware. The beginnings of the Jonuta horizon are provisionally equated with Tepeu 2 times, the horizon as a whole being assigned to a post-Tepeu 2 level. A number of vessel forms present at Palenque are duplicated in the Jonuta horizon but, speaking broadly, they do not correlate too well on the basis of ware. Thus, shapes characteristic of the dominant red-brown pottery of Palenque are likely to be found in black or Fine Gray (Fig. 1 *d*, *f*; Berlin 1956, Fig. 4 *w*, *x*, *gg*). Elements of decoration sometimes correspond but tend to appear on different shapes or wares. Meriting attention, nevertheless, are vertical-necked jars with notched or indented rims (Fig. 6 *b*; Berlin 1956, Fig. 4 *l*), thumb-impressed basal filleting (Fig. 5 *b-d*; Berlin 1956, Fig. 4 *gg*); vertically combed or grooved cylinders (Fig. 4 *g-i*; Berlin 1956, Fig. 4 *ll*); and a band arrangement which includes incised V-shaped units, alternating members of which contain punctations (Fig. 7 *g*; Berlin 1956, Fig. 4 *oo*). A body of carefully smudged black pottery at Palenque and in various coastal Tabasco sites is similar in being fine textured and regularly possessing a wide, even black core (see Berlin 1956: 121). Flat-based bowls with outcurved walls are common in the black pottery of both areas. More specifically, fine black bowls with stepped basal flange occur in the Tabasco plains and, rarely, at Palenque. This form is of Tepeu 2 date in the Petén (Smith 1955, Chart 1, Type 100).

It is also noteworthy that developmental patterns show partial similarity at Palenque and the Tabasco sites. Polychrome falls off to be replaced by black ware. There are indications that untempered wares may have been rising in popularity toward the end of the Palenque sequence, but they never attained the ascendency which was reached by Z Fine Orange on the Tabasco plains. This suggests that, barring overriding geographical factors, the Palenque sequence terminated prior to the close of the Jonuta horizon.

Speaking still more broadly, Palenque, especially in its late phases, parallels certain widespread Gulf Coastal ceramic tendencies. Sand tempering is common in the alluvial portions of the Veracruz-Tabasco-Campeche region and, of undoubtedly greater cultural significance, fine textured pottery has a strong development (Ekholm 1944; Drucker 1943a, 1943b, 1952; Berlin 1956, Ruz L. 1945; Brainerd 1941). Gray-black is one of the fine paste ceramic groupings that achieves some prominence in Middle and especially Upper Tres Zapotes (Drucker 1952: 99-102, 131). Within this category, Drucker's "real Fine Paste Gray" seems generally comparable to Fine Gray in the Maya area. Black, fine paste and coarse, is fairly important throughout the Tres Zapotes sequence. As has been seen, however, the rise of black ware in the Maya sites to the east gives evidence of dating toward the close of the Late Classic. Still farther along the Gulf Coast, the rare untempered Thin Black of Dzibilchaltún appears to date midway or later in the Late Classic. In general these features of sand temper, fine paste, and gray and black colors deviate from the ceramic patterns of the Maya heartland in the Petén. Thus in the latter area black ware, never very abundant, appears to decline late in the Classic (Smith 1955, Chart 1; Thompson 1939: 163, Table 12). Though a ceramic cleavage of some sort between Palenque and the Petén is clear, the significance of the generalized correspondences which Palenque shares with the coast is yet to be determined.

Detailed discussion of the elaborate Palenque figurine complex will not be entered upon here. Figurines are numerous and depict a wide variety of subjects — realistic humans, warriors, women, grotesques, animals, and birds. Both the molding and modeling techniques are used. Figurines appear most abundantly in the upper levels and have not been found in the earliest deposits located at Palenque. This may indicate an Early Classic date for these levels or possibly inadequate sampling. The temporal position of the figurines is clearly Late Classic. Relationships exist with the sites in the Tabasco lowlands as well as inland, toward Piedras Negras and the Alta Verapaz.

Incensarios, like the figurines, show a rich development of the ceramicist's art. The flanged tubular form of incense burner, bearing tiers of masks, has specific resemblances to specimens from Zopo Cave, near the Tabasco-Chiapas border (Sáenz 1956; Blom and La Farge 1926, Figs. 122-4). Ladle type incensarios with animal head handles are present, virtually duplicating some from the Alta Verapaz (Dieseldorff Collection). Pedestal-base censers, occasionally having a few small, irregularly arranged spikes on the surface, also occur.

The ceramic position of Palenque is still imperfectly understood, but certain generalizations are justified at the present time. Little indicative of Preclassic has been found and little that suggests Early Classic. The earliest part of this comparatively short sequence shows specific affiliations with Piedras Negras and, in a generalized way, participates in some of the broader Maya patterns. Palenque, however, diverges sharply from these norms during the major portion of the sequence that has been recovered. The distinctive stamp of its ceramics is great when looked at from the perspective of, say, the Petén; it is rather less when viewed from the Tabasco plains or perhaps the Alta Verapaz. To some extent, the stratigraphy found 30 years ago by Blom in the nearby Yoxihá tombs recapitulates the story of Palenque's increasing divergence. In late times, however, a complex involving fine paste wares, basal-break bowls, incised monkey designs, and dentate stamping serves once again to link Palenque with Piedras Negras, to strengthen its ties with the Tabasco coast, and even to provide connections with far-off Yucatán. But, to judge from our excavated samples, Palenque was abandoned before such horizon markers as X Fine Orange or Plumbate had a chance to assert themselves.

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A PERUVIAN IKAT FROM PACHACAMAC

Ina VanStan

THE IKAT technique, that of producing designs in a fabric by means of a resist-dyeing process in which the yarns of the warp, of the weft, or of both the warp and the weft, are pattern-dyed prior to weaving, was believed, until recently, to have been unknown in pre-Columbian Peru (Crawford 1916: 154; Dixon 1928: 201-9; Means 1931: 490). To date only a few examples of archaeological Peruvian textiles patterned by this method have been reported. Dressen (1930: 67) and Bird (1947: 73-4; 1952: 359; Bennett and Bird 1949: 285) mention some of these and Kroeber has spoken of ikats from Supe being present in the University of California Museum of Anthropology (personal communication, September, 1949). To the best of the author's knowledge descriptions of only 4 Peruvian ikats have been published (Table 1). Another example came to light in The University Museum of the University of Pennsylvania, when upon examination, an apparently insignificant small bundle of charred rags in the Max Uhle collection of Peruvian artifacts from Pachacamac, proved to be 4 remnants of ikat cloth (Fig. 1). This specimen was listed in the Museum catalog as number 30355 *a*, *b*, *c* of the Max Uhle collection from Pachacamac. One fragment, adhering to another piece, was unmarked and now has been labeled *a'*. In Uhle's field catalogs all of the fragments carried the number 1770 *p*.

Further investigation showed that these textile fragments constitute one of several museum specimens in the same collection (29306; 30211 *a*, *b*; 30221 *a*, *b*; 30296 *a*, *b*) which display evidence of resist dyeing of the yarns. The remnants under consideration provide the only examples in this group in which a decorative design was obtained solely through the use of the ikat technique, with no obscuring of the evidence of yarn pattern-dyeing through the addition, subsequent to weaving, of overpainting, cloth tie-dyeing, or stamping. The ikat technique was applied to the warp only, as in the other examples from Peru. The dye used for patterning penetrated the warp yarns to a considerable degree, but in no case has the color appeared on the weft yarns, showing that the pattern could not have been added after weaving.

The specimen was taken from the Cemetery of Pachacamac by Max Uhle during his excavations of 1896, while with the William Pepper Peruvian Expedition. Checking of the expedition's original handwritten field catalogs revealed that Uhle had recognized the presence in this fabric of designs produced by the ikat technique. He described the specimen in the

English version as: "Two pieces patterned by interrupted dyeing of the threads of the chain," and in the German: "2 gewebestücke, in denen das muster durch uterbrochene Farbring der Füden der Kette gegeben ist." No mention of this technique appears in *Pachacamac*, Uhle's report dealing with the findings of this expedition, although the presence of cloth tie-dye has been noted (1903: 29, 32, Fig. 31).

The textile under consideration consists of 4 fragments of cotton cloth, all of which correspond exactly in yarn type, yarn count, weave, color, and design. The similarities suggest that the 4 pieces might have been parts of a single web, but remaining selvages and design repeats show that this was not the case. Reconstruction indicates that these fabric remains, now fragmentary and badly charred, represent 3 separate cloths, each of which measured originally, approximately 85½ inches in length by 20 inches in width. The dimensions of two of the webs have been established on the bases of the remaining selvages, matching textures, and design elements (Fig. 2). Those of the other fragment were projected through reference to the identity of its detail with that of the other pieces and its failure to fit in as a component part of either of the other webs. Figure 1 shows 3 fragments constituting parts of 2 webs. There is an overlapping of the 2 webs in the central section of the photograph. Figure 3 presents a detail of the fourth fragment which originally formed part of a third web. The weave for all of the pieces is plain or tabby in which one warp crosses one weft. The count is square, averaging 14 per inch, with a range of from 10 to 18. Both warp and weft yarns are single-ply, S-spun, crepe twist, with irregularities of spinning which have resulted in yarns varying in diameter throughout their lengths. Wide spacing of the warps and wefts, during weaving, has produced an open gauzelike effect in the finished fabric (Fig. 3).

It seems improbable that the exact correspondence between the 3 separate webs could have been produced either accidentally or by deliberate copying. It is more likely that the warping, tying, and dyeing of the yarns for all of the webs was done at the same time, by one person or under the supervision of one person, and further, that all of the fabrics were intended to be used together or for a like purpose. There is no evidence of sewing although several sections of selvage are intact. (The sewing stitches visible in Figure 1 are modern, attaching the specimen to the backing.) Thus it is impossible to judge whether or not the 3 original cloths were designed to be joined into a single finished piece, or perhaps were planned to be put together with strips of contrasting weaving.

Each length of the fabric has a design consisting of 2 large diamond- or lozenge-shaped areas delineated by a double outline of rectangular blocks or steps (Fig. 4). Within each lozenge are 6 horizontal rows: four of birds, two of small geometric figures. The selvages of the fabric have corresponding birds and small blocks. The original color of the warp yarn appears to have been white, or the light buff of unbleached "white" cotton. Light blue, and tan or light brown dyes were used. Thus, the design is in white and blue on a tan ground. All of the weft is of a henna or reddish brown

Table 1. Published Reports of Peruvian Ikats.

Reported in	*Warp Grouping*	*Design Description*	*Provenience (as published)*	*Collection (as published)*
Bird 1947	Paired	Human and bird figure	Virú Valley, Huaca de la Cruz	American Museum of Natural History
Dressen 1930	Single (?)	Simple step motive	Barranca north of Pacasmayo	Farbenindustrie
d'Harcourt 1934	Paired	No. 1, simple step motive No. 2 (same example as in Dressen)	Central Coast of Peru	Trocadero
Snethlage 1931	Paired and in fours	Mythological figures	Probably Pachacamac	Museum für Völkerkunde, Berlin

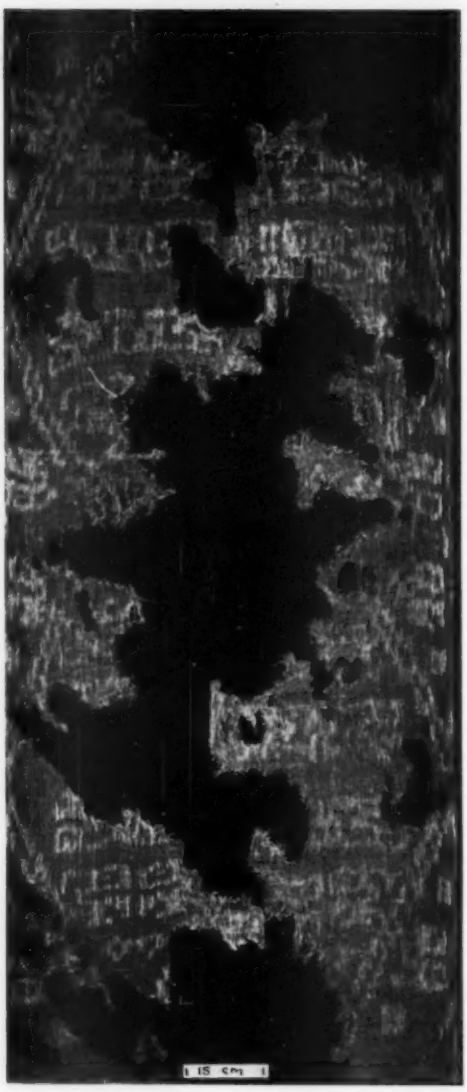

FIG. 1. Remains of 2 cotton cloths showing designs in ikat technique, from Pachacamac, Gravefield I. University Museum, University of Pennsylvania, Max Uhle Collection, Specimens 30355 *a*, *b*, *c*. (Metric scale 15 cm.) (Photograph by Reuben Goldberg.)

color without patterning. Color data are shown in Table 2.

The provenience of the specimen was given by Uhle as Gravefield I of the Cemetery of Pachacamac. Unfortunately, no further detail

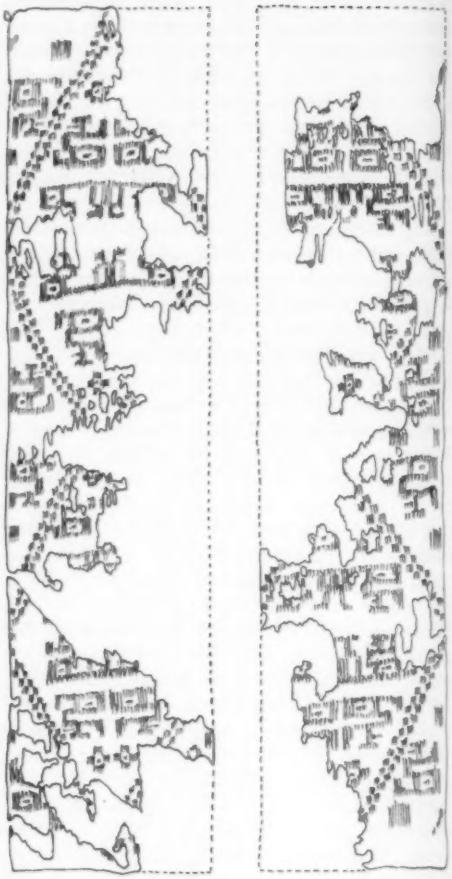

FIG. 2. A reconstruction of the ikat design from a single web of the Gravefield I textile.

concerning the exact position within the gravefield has been included in either the German or the English version of Uhle's original field catalogs, nor has any notation concerning this particular fabric been made in Uhle's monumental published report, *Pachacamac*. Gravefield I, or Cemetery I, as designated in the above volume, lay within the enclosure of the "Temple of Pachacamaj" (Uhle 1903: 12, 41, Map of the Ruins) and was filled to overflowing with burials, old ones having been disturbed repeatedly to make room for new (Uhle 1903: 16). In his field catalogs, Uhle classed his finds as from "Gravefield I" and from "the oldest part of Gravefield I." The specimen

under consideration was listed simply as from Gravefield I. Cotton gauzelike ponchos are mentioned in *Pachacamac* as typical of the textiles found in the "uncovered ground," as being present in both levels of "new soil," and in front of the Temple. Although absent from the detailed lists of artifacts taken from the few undisturbed burials of Cemetery I, they are included as one of the types characteristic of these burials (Uhle 1903: 35, 37-9, 42-4). According to Uhle, both the artifacts and the native and Spanish reports give evidence that this whole burial ground was in continued use over a considerable length of time, extending from pre-Tiahuanaco into Inca times, but in Cemetery I, the Inca period is not believed to have been represented (Uhle 1903: 18-41).

Several items of interest appear in a comparison of the above details with those which have been reported for other Peruvian ikats (Table 1). It has been suggested, in connection with the ikat from Virú Valley, that the use of paired warps in weaving will not produce the best results when warp yarn tie-dyeing is used as the design-producing technique (Bird 1947: 77). Paired warps appear in all of the Peruvian ikats previously reported, with one possible exception. This exception is in a fabric from north of Pacasmayo, noted by both Dressen and d'Harcourt. The weave is not discernible in the reproduced photographs. D'Harcourt's classification as muslin, "en coton, armure toile, genre mousseline" (1934: 136, Pl. 51, *2*) and Dressen's as "one up and one down" (1930: 66-7) indicate plain weave, but since the terms, *plain weave*, *tabby*, and *muslin* often are used to include the basket weaves, those having paired warps, or wefts, or both (O'Neale 1942: 152, 153, Table 2; Bird 1952: 358), it is impossible to draw a decisive conclusion from the published accounts. The other specimen shown by d'Harcourt, classified only as from the Central Coast of Peru, is described as having "two warp threads used at a time" (1934: 73, 74, Pl. 51, *1*). The ikat from Virú Valley, analyzed by Bird, also has paired warps (1947: 77). The Pachacamac example reported by Snethlage has some warps paired and a few used in groups of four (1931: 50). The Pachacamac Gravefield I cloth has all of the warps used singly (Fig. 3).

TABLE 2. FABRIC COLORS* MATCHED TO DICTIONARY CHARTS (Maerz and Paul, *Dictionary of Color*, 1950).

Descriptive color name used in text	*Maerz and Paul classification*	*Maerz and Paul common name*
Henna‡	7 H 12	Mohawk
Light Blue	28 B 1	———
Tan‡	12 C 4	Malacca

* The range of color variation within each category is quite wide. Ten yarn samples selected from noncharred fabric areas were matched for each color. The classifications recurring with the greatest frequency have been presented.

‡ According to the *Dictionary of Color*, *henna* is the color 6 J 12, *tan* is 12 L 11. These names, nevertheless, were chosen as being more meaningful descriptive terms than the less well-known common names given by Maerz and Paul.

This would indicate, according to the above theory, that the Gravefield I example shows the better adjustment of weaving to the use of the ikat technique. It should be pointed out further, however, that the red-brown wefts of the square-count Gravefield I textile cloud the ikat designs, as do the stripes of alternating brown and white in the weft of the fabric from Pacasmayo. Likewise, the uneven spinning and the crepe twist of the yarn in the Gravefield I specimen have tended to blur the design outlines, and the use of square count with like yarns in warp and weft, has failed to produce a cloth with clear-cut warp designs.

The basis for the theory presented above is acceptable as evidence of lack of adjustment to the use of a new or an unfamiliar technique only if we assume that a clear-cut design outline constituted the desired objective. The use of warp-faced weaving and smooth even yarns would have produced more distinct patterns in a warp ikat than those appearing in the above examples. From periods dating prior to any claimed for the Peruvian ikats thus far reported, smooth, evenly spun yarns and warp-faced fabrics were produced in Peru. The techniques of tapestry, double-cloth, and "patchwork" weaving were in use (O'Neale 1942: 152-6; Uhle 1903: 29-32), all of which provided means for obtaining clear-cut design areas in distinct colors. The ikat section of the Pacasmayo specimen, shown by d'Harcourt, has been attached to a section having a sharp pattern of stripes produced by means of a nonikat technique, in this case, the simple grouping of warp yarns of contrasting hues (1934: Pl. 51, *2*). Fabrics from areas outside of Peru indicate the intentional use of both strong and muted patterning. Pattern-weaving, used in the same web

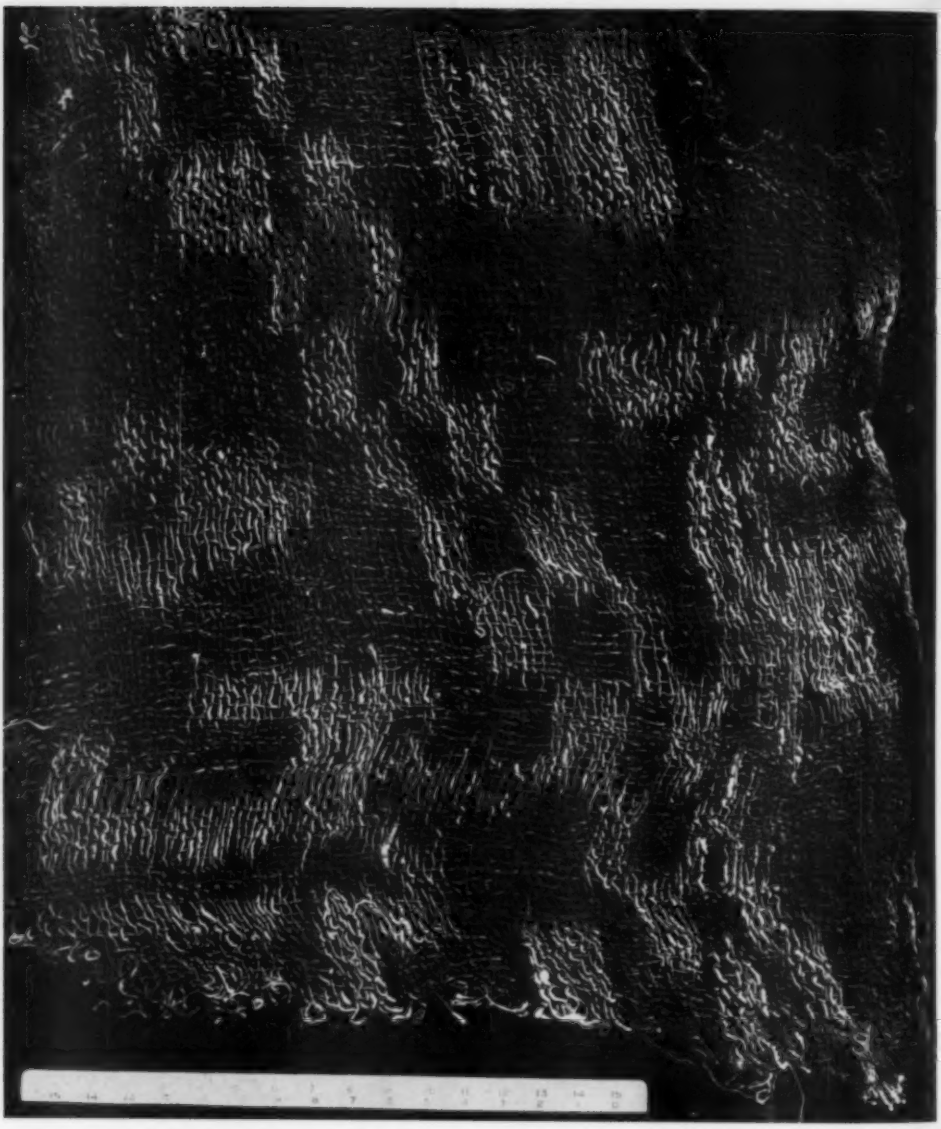

FIG. 3. Detail of a textile fragment showing designs in ikat technique, from Pachacamac, Gravefield I. University Museum, University of Pennsylvania, Max Uhle Collection, Specimen 30355 *a'*. (Metric scale 15 cm.) (Photograph by Reuben Goldberg.)

with weft and double yarn tie-dye, appears in Japanese silk ikats from Oshima (photographs in the author's files). Examples of paired warps in warp ikats can be cited from Indonesia (Haddon and Start 1936: 107-8, 111-2, Pls. 33-4), where the ikat technique reached a very high level of development. Haddon and Start (1936: 138) compare ikat to the "shadowy" patterning obtained by modern warp printing. Bühler speaks of the softness of ikat designs providing their chief charm (1942: 1586). Is it not probable that for both the Peruvians and other skilled weavers, ikatting produced a desirably different, shadowy effect and that a quality or attainment norm based on design clarity is unsound?

The argument has been presented that overpainting is an adjustment or correction of the design made because of incomplete mastery of the basic technique (Bennett and Bird 1949: 285; Bird 1947: 77). Overpainting, absent from the Gravefield I specimen herein reported, is present in other specimens from the same site, and is present also in the Virú Valley example. Iklé mentions overpainting as used on the warp ikats of North Borneo (1931: 34) a region known, also, for its extremely complicated double ikats. Speaking of the somewhat closely related technique of cloth tie-dye, Uhle explains the application of an additional color to a Pachacamac example as being "hand done," a distinction from being dipped into the dye (1903: 32). Iklé refers to overpainting being applied "as accents," if desired, on Javanese *Plangis* (1941: 12). Likewise, the use of free-hand overpainting is an accepted procedure in the production of intricate Japanese cloth tie-dye fabrics (photographs in author's files). A Persian technique of considerable antiquity, *Kalemkár* or "pencil-work," used for producing patterns on cotton cloth, combines block printing with hand painting (Smith 1924: 20), indicating a widespread acceptance of the use of painting in combination with other patterning methods. It appears, thus, that this process of overpainting should be classed, more properly, as an expedient means of producing a certain desired effect, rather than as a corrective device.

The fact that all of the known Peruvian ikats are warp ikats may point toward a limited development of the art of yarn pattern-dyeing. The theory has quite general acceptance that

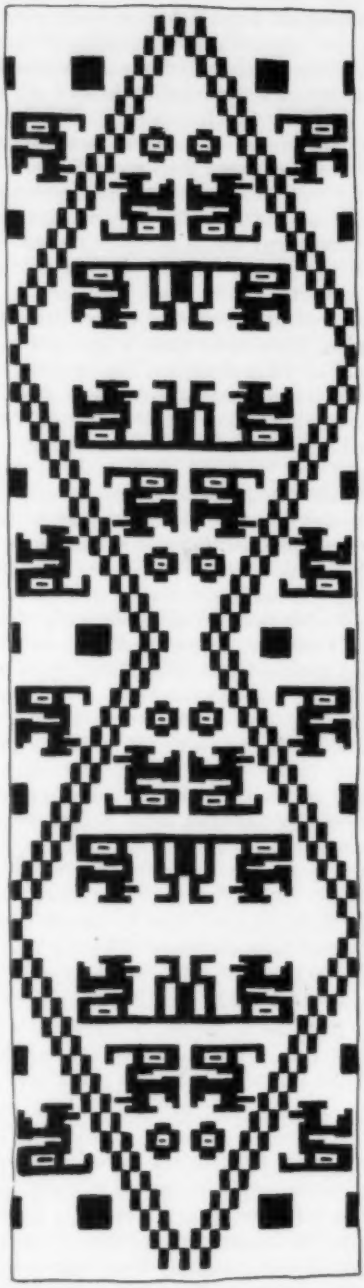

Fig. 4. Diagram of the textile fragments shown in Figure 1. (There is a slight overlapping of these 2 separate webs along the central section, in the photograph.)

warp ikats are produced more easily than weft ikats, and obviously they are simpler than the double type which includes both warp and weft dyeing and must be handled in such a manner that the pattern elements match when the fabric is woven. Indonesian weft ikats developed out of warp ikats according to Bühler (1942: 1604). Iklé credits a predominance to warp, over weft and double ikatting (1931: 8). This theory seems to be supported by numerical preponderance, but further substantiation is needed.

The limited number of colors used in the Peruvian ikat fabrics again suggests a lack of mastery of the technique. The largest number used in dyeing seems to have been three, with the original yarn hue making a fourth (d'Harcourt 1934: 73-4). The process of tying certain areas of the yarns which have been grouped into small bunches, to prevent the color from penetrating to the protected areas when the skein is immersed in a dye bath, and then untying some of these before a second immersion (or the use of the reverse method of tying certain additional areas after each dyeing), means that any unprotected sections are recolored with each additional dyeing. This results in the background color, or that of any continuously unprotected areas, being a combination of all the dyes used, producing, if the primary colors (red, yellow, and blue) are present, black or near-black with a predominance of the strongest hue. While this technical limitation does not preclude the use of many colors, it tends to make a limited number consistent with the technique, even when highly developed, as may be noted in Indonesian and Japanese ikats. The use of patchwork weaving in Peruvian cloth tie-dye (Bennett and Bird 1949: 281; d'Harcourt 1934, Pl. 50, 3; Uhle 1903: 32, Fig. 31) may be an outcome of the Peruvians' recognition of the inevitability of the neutralization of colors in overdyeing, the problem being solved by the ingenious device of sectional weaving (O'Neale 1933: 87-94). Custom also must be considered as a limiting factor in the use of color. Established practice tends to fix or limit, far below the available range, the number of hues used for any assigned purpose. Thus it appears to be doubtful that a limitation in the color range can be considered as a criterion of the developmental level of the ikat technique.

D'Harcourt has classed all Peruvian ikat designs as simple variations of a step pattern and thereby indicative of a lack of technical accomplishment (1934: 73). Neither the design of the Virú Valley example nor that of either of the Pachacamac fabrics fits into this category, the designs being more complex than those of the specimens from the Central Coast and Pacasmayo, reported by d'Harcourt. The manipulation of the pattern yarns in both the Virú Valley and the Pachacamac cloths involved a considerable amount of planning. Unfortunately, the fragmentary and charred condition of the Gravefield I ikat makes it impossible to check completely the accuracy of pattern yarn placement. There are many discrepancies in the widths of the individual blocks of the design and a few pattern yarns obviously are lacking at the side selvage of one section. An odd variation of the blue and white in the stepped outlines of the lozenge suggests some difficulty in the preplanning of color areas. However, if two of these cloths were planned to be seamed together to make a design unit, the odd blue and white variations may have been intentional, as they correspond when 2 breadths are placed side by side. Comparison of the varying hues, values, and intensities of the colors, and of their relative placements on individual yarns, indicates that the warps for all 3 pieces were dyed together.

The setting up of plans for the pattern-dyeing of the warps for 3 or more webs at one time, and the using of 2 colors in addition to the background, was not a simple task. Probably, after the stretching of the warps, all sections to be white and blue were tied, and the dyeing proceeding in the following manner: The first immersion was in a dye bath of a warm tan hue which colored the exposed background areas. The second dipping followed the untying of the set of bindings which protected the parts to be blue. The light blue dye colored the newly exposed areas blue, but neutralized the background to some extent, through the over-dyeing of the tan. Removing the remaining tyings left the "white" sections the color of the original yarn.

When it is taken into consideration that each of these Peruvian cloths was woven with 4 selvages, the warps of each being continuous, winding back and forth from end to end, it is obvious that even the yarns for simple step designs must have been counted and tied in

place. The theory that all of the warps, might have been dyed alike in alternating blocks of color, and then slipped into different positions to form a flame or arrow pattern (Iklé 1931: 3, 7, 8; Bühler 1942: 1605) or a stepped design, would not work out well with a warp made of a continuous yarn, this being practicable only where the length adjustment of individual yarns could be controlled. The use of a continuous warp excludes to some extent the possibility and need for figuring out mathematically the number of yarns needed in a certain dye-pattern and, later, the sorting of these into their respective positions. It would be both possible and technically practical to superimpose one warp on another, or to fold half of a bilateral warp design on itself, in order to tie the corresponding sections at one time, provided the groups of yarns included in any one binding did not exceed a thickness into which the dye would penetrate satisfactorily to the point of stricture.

The evidence indicates that Peruvian ikat makers were accomplished to a level where they were willing to undertake complicated yarn pattern dyeing. There has not been reported, as yet, an example in which the design was developed with a high degree of accuracy. Based on evidence from a total of only 5 pieces, it seems presumptious to assume that the presently known standard of quality is the highest level for all Peruvian ikats.

The general workmanship of the Gravefield I textile is good. The fabric is the same type of sheer cloth which often occurs with 2 or more breadths seamed together and with the outer edges finished by means of narrow sewed-on borders of tapestry. There are a number of other pieces of this sheer fabric in Uhle's Pachacamac collection (Uhle 1903: 35, 37, 42, 45), and they are plentiful among the artifacts from other Peruvian sites. There is nothing, except the ikatting, which makes the Gravefield I piece in any way remarkable. The basic fabric appears to be a common or "standard" cloth type for its particular time and place. Is it not probable that similarities to the standard cloths of their respective times would prove to be present, if the remaining ikats were compared with the other fabrics with which they were associated formerly? If so, it seems likely that the *idea* of ikatting or of yarn pattern dyeing was transmitted from person to person and place to place and that the spreading of the ikat technique does not represent a case of the dissemination of a full-blown applied art.

Attempts to classify Peruvian ikats as late or early on a basis of technical achievement are not particularly fruitful, since only the method of pattern-dyeing sets them apart from other fabrics found generally throughout Peru. There remain, however, some bits of more concrete evidence. The Virú Valley textile was a surface find (Bird 1947: 73) in a cemetery at the Huaca de la Cruz, from which pottery classed as Gallinazo, Mochica, and Tiahuanaco was obtained. The Pachacamac Gravefield I ikat was from a large cemetery, parts of which are known to have contained artifacts as late as Inca and possibly also post-Columbian, although all of the materials taken from the area designated as Gravefield I are believed to be pre-Inca (Uhle 1903: 6, 18, 41). The other Pachacamac example is "said to be from Pachacamac" (Snethlage 1931: 49); no more specific site details are available and even the general provenience seems to be in doubt. One ikat is classified only as from the Central Coast (d'Harcourt 1934: 136), another as from "Barranca, north of Pacasmayo" (Dressen 1930: 67; d'Harcourt 1934: 136). Although the site evidence so far does not justify any specific time conclusion, the Gravefield I piece gives additional weight to the conviction that the origin of the practice of yarn tie-dyeing in Peru was not only pre-Columbian, but pre-Inca, and it is believed that other known ikats, for which data have not been published, will provide further substantiation.

Designs have been used rather widely as a means of assigning time relationships to textiles. On this basis, Peruvian ikats have been classed by Bennett and Bird as being no earlier than the Late Coastal Tiahuanaco pottery (1949: 285). The Gravefield I example, although quite different in design from the ones included above, appears to belong within the same time span (see Willey 1948: 9, Table 1).

The designs of the Gravefield I ikat resemble quite closely those of the southern coastal, Middle Ica pottery illustrated by Kroeber and Strong (1924: 144, Fig. 15, Pls. 32, 36, 38, 39 *a*), and this resemblance extends in some degree to the late Ica and Inca designs. The ikat motives have the characteristics which are listed by the above authors (1924: 103, 108, 112-5) and by Bennett (1946: 137-8) as typical of the decoration of the Late Ica I Period,

namely: geometric forms, diamonds and squares, conventionalized birds, small designs arranged in slanting rows to form lozenges. Bird forms, diagonal arrangements, and geometric motives appear also on textiles and pottery from many other Peruvian sites and during an extensive time span, but their similarities to the Gravefield I ikat designs are less marked than are those of the Ica pottery.

Late Ica I is considered to be a continuation of the Middle Ica II style which corresponds to Coast Tiahuanaco B, and to Pachacamac D, late Middle period classifications, according to Bennett (1946: 137-8). Willey (1948: 9, Table 1) places both North and Central Coastal Tiahuanaco prior in time to the Middle and Late Ica styles of the south coast.

Bennett claims plain cloth (presumably, plain weave cloth) with ikat decoration to be typical of the textiles of the Chimu Period (1946: 141). This indicates Late north coastal, as well as the previously cited Middle to Late south coastal affiliations. Although the Pachacamac site belongs to the central coastal culture area, evidences of both Chimu culture and of Ica type designs have been found at Pachacamac (Strong and Corbett 1943: 89). While it is possible that the Gravefield I ikat may have been an Ica trade piece, it must be noted that to date none of the known ikats has been found south of Pachacamac.

Possibly the Gravefield I specimen represents an example of the linking of a technique from the north with designs from the south, these being used with cotton, the basic coastal fiber, fabricated according to a standard textile method. The development probably took place, if the specimen was made where it was found, in the central geographical area where north and south met, at a time when the Middle period styles were merging into the Late.

Conclusions. Weavers and dyers, working closely with all of the basic textile techniques, would have been likely to follow patterns of experimentation similar to one another, regardless of their geographic location or the presence or absence of outside contacts. Experimentation would not have precluded the possibility of copying from another group of craftsmen either an incipient or a fully developed craft, if the opportunity was present, but once the techniques of painting and dyeing and the concepts of functional and applied ornamentation were mastered in an advanced textile producing society, barring social taboos, these techniques were most likely to have been applied to textiles, sooner or later, according to many, if not all, of their various possibilities. These possibilities, being technically limited in regard to the painting and dyeing of textiles, would have had a greater probability of falling into like patterns of accomplishment, on a chance basis, than would have been the case with some of the less narrowly circumscribed crafts. Development could not be expected to have occurred according to the same decorative or technical standards of quality in any 2 independent areas.

Any particular society would decide, within itself, which items were worth accepting and expanding beyond either a copying or an experimental stage. The presence of distinctive patterns produced in various textile techniques, or used repeatedly in the development of new designs, would indicate some degree of acceptance and some place in the social or economic scheme for the resulting fabrics. The finding of only a few fairly simple ikats would suggest that development had not moved beyond a trial stage, either in terms of technological accomplishment or of social acceptability.

The nature of the Virú Valley and of the Gravefield I ikats, and probably also the Pacasmayo cloth, indicates that Peruvian accomplishment in the use of the ikatting technique had passed the level of early experimentation. How far progress had gone beyond this point cannot be determined at present, nor can any criteria be set up for distinguishing between the borrowings and the locally developed technical and aesthetic skills used in the production of ikats. There is too little evidence available at present on which to base meaningful conclusions in these respects.

Loss of evidence has resulted, as has been pointed out previously (Bird 1947: 73, 74), not only because of the perishable nature of textile materials, but from the nonspectacular character of ikat fabrics, due to their shadowy designs and muted colorings. Collectors concerned with display materials and dealers searching for marketable objects no doubt discarded many ikat cloths because of their lack of interest to the casual observer. Unfortunately, a knowledge of textile technology is rare among professional archaeologists, since this has not been considered to be a requisite part of their training. As a consequence, textile materials have been lost in the field, and many textile

records have been regrettably limited in scope. Similarly, many nonspectacular and fragmentary cloths remain unanalyzed in museum and private collections. The scarcity of information and the exceedingly limited number of published technical studies handicap the student of prehistoric textiles in drawing conclusions concerning either the local development or the origin and distribution of the ikat technique in Peru. It is believed, however, with the further information which may become available, that the ikat fabrics of Peru, due to their basic characteristics and the narrow limits of the technologies involved in their production, eventually may provide the data for one of the most interesting and revealing chapters of Peruvian prehistory.

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IRRIGATION SYSTEMS IN THE VALLEY OF TEOTIHUACÁN

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SEVERAL excavations have recently been completed in the Maravilla system, a small abandoned irrigation system in the Valley of Teotihuacán, discovered by Armillas on an aerial photograph in 1954 and reported on by Armillas, Palerm, and Wolf (1956). For a recent summary of irrigation studies in Mesoamerica, see Wittfogel (1957: 19-20). For an earlier summary of climatic conditions in the Valley, see Millon (1954). The present paper is a preliminary report on two of these excavations with additional data on other abandoned and existing systems of irrigation in the Valley.*

The Maravilla system is located in an area of gently rising ground in the northwestern part of the Valley of Teotihuacán between the Cerros Maravilla and Cerro Atlatongo (see Fig. 1). It derives its name from the former. It is a small system fed by intermittently flowing streams, situated north of the fertile flatlands of the central part of the Valley in an area of poor soils, often less than a meter in depth. Because of the limitations imposed by nearby hills and rolling terrain it was never capable of irrigating a large amount of land. The character of the soils in this part of the Valley and the amount of potentially irrigable land it possesses contrast sharply with conditions in the central part of the Valley where soils are rich and deep (6 to 8 m.) and entirely irrigable, and where the supply of water is continuous.

The significance of the Maravilla system, if its age can be established, lies in the marginal character of the area it served, and in the relationship of the system to systems in the central part of the Valley to which it is connected (see Fig. 1), for it does not appear to be an area where irrigation would have been initially developed. Its construction would have yielded relatively poor returns for the effort involved in contrast with the rich yields which a similar expenditure of effort would bring in the central part of the Valley even without the creation of the unified system which presently exists. This suggests that the Maravilla system was built in response to a need for a fuller exploitation of the poorer land of the Valley, presumably after the potentialities of the central part of the Valley had been at least partially realized. Its existence, whatever its age, thus implies the previous establishment of systems in the central part of the Valley.

The excavations conducted within this system were not expected to solve the problem of the antiquity of irrigation in the Valley because, in addition to its marginal nature, surface indications did not suggest that it had any great antiquity, the earliest pottery found in any significant numbers on the surface being of the Tula period (Mazapan Red-on-Buff and other types).

The details of the Maravilla system were described in the report of its discovery and there is no need to repeat that description here. In brief, however, it consists of a complex of 3 dams, a diverted stream, and a small canal (see Fig. 2). Dam I is a large storage dam at the head of the system (Fig. 2 *a-a'*). Dam II is a modern diversion dam, located immediately south of the point where the stream makes a sharp S-curve (Fig. 2 *b*). It serves to prevent the stream from breaking through at this point and flowing directly to the south, which it did during floods 20 to 30 years ago before the building of the present dam. According to a local official in Atlatongo there is no memory of the stream actually having flowed directly to the south of the present dam. It only took this course temporarily during periods of heavy rainfall. Nevertheless there is a marked depression south of the dam which can be easily followed for a distance of some 800 m. (see Fig. 2 *d*), and which bears all the earmarks of a former stream bed. The topography at this point suggests that the curve made by the stream in front of the present dam is not a natural one. Moreover, a remnant of a former stream course also exists to the north of Dam II (see Fig. 2 *b*), which the flood explanation would not account for. All of this suggested that at some time in the past the stream had

* The excavations reported on here were conducted under a grant from the National Science Foundation. I should like to express my gratitude to A. R. V. Arellano and Mariano Villegas of the Instituto Geológico Nacional and the Escuela Nacional de Agricultura respectively, and to Benjamín Olvera of Atlatongo and Peter Kunkel of the University of California at Los Angeles for their invaluable assistance during the past year.

been diverted to its present course by a dam, but this could only be proved by excavation. Dam III (Fig. 2 *f*), also a diversion dam, is located a short distance to the south of the canal intake (Fig. 2 *e*). All traces of the dam itself have vanished. Its former existence is attested to by the presence of 2 parallel lines of post holes cut into the exposed *tepetate* (the Mexican term for the semi-lithified soils normally underlying soils of lesser compactness in this and many other parts of Mexico). The function of this dam seems to have been the diversion of water into the canal intake. The canal intake is bordered on the down-valley side by a row of post holes, similar to but smaller than those comprising the remains of Dam III. Their probable function has been commented on and need not be repeated here.

The course of the canal beyond the intake, after it leaves the tepetate and enters overlying soils, can be followed with no difficulty. It is marked by a shallow depression at the upper end which becomes progressively wider and deeper as it continues to the south except where it is interrupted by a road (Fig. 2 *h*). Some 600 m. south-southwest of the intake the depression left by the canal becomes shallow once again and vanishes at about 700 m. Its course thereafter is problematical but it seems to veer to the southwest on the aerial photograph. (For an aerial photograph of the system and photographs of some of its elements, see Armillas, Palerm, and Wolf 1956.)

Excavations within the system were designed primarily to determine its age and the sequence, if any, in the construction of its elements. Since

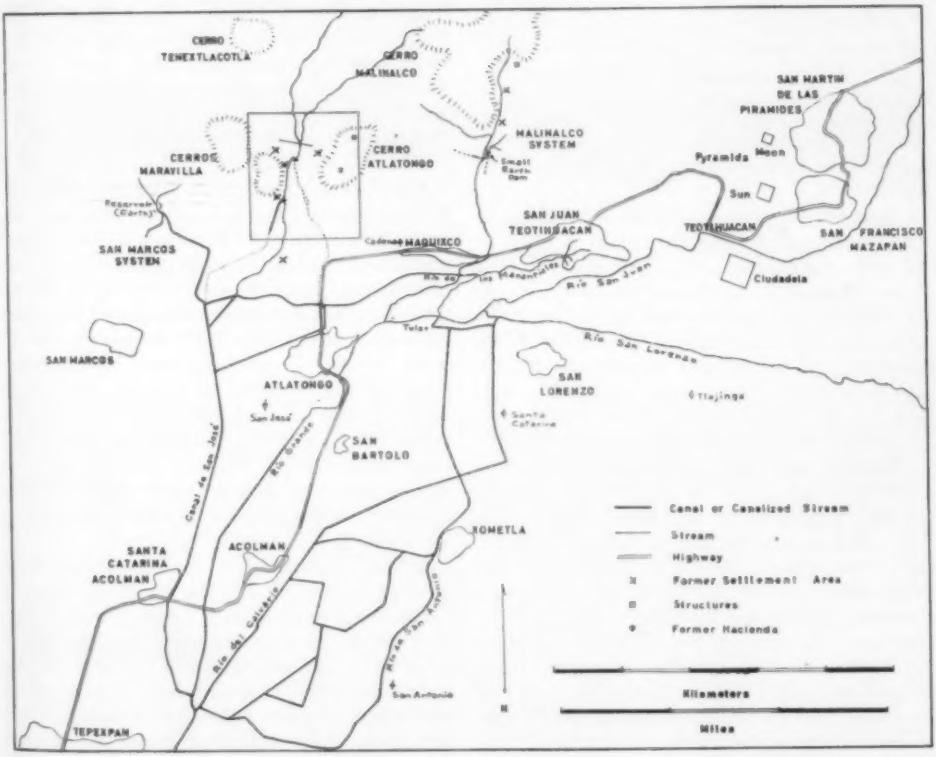

FIG. 1. Valley of Teotihuacán, northern and central portions. Rectangle in northwest section of map outlines the Maravilla system which is enlarged in Fig. 2. The 3 canal systems in the northern part of the Valley, San Marcos, Maravilla, and Malinalco, are not now in use. The remainder of the canals, those in the central part of the Valley, are presently in use, the 3 westernmost since at least 1580. Canal and stream distinctions were determined by surface inspection. The city of Mexico is approximately 25 miles southwest of Teotihuacán.

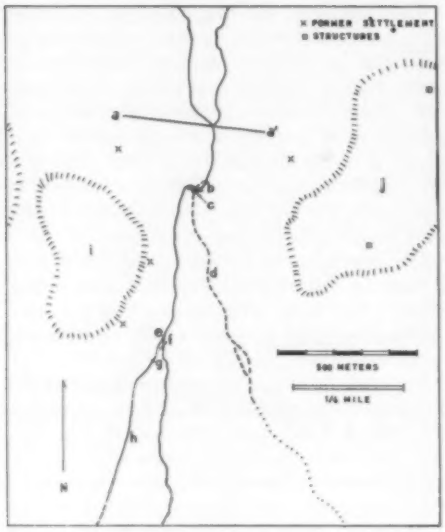

FIG. 2. Maravilla irrigation system. *a-a'*, Dam I; *b*, Dam II; *c*, cut across former stream bed (see Fig. 4); *d*, former course of stream; *e*, canal intake; *f*, Dam III; *g*, cut across canal bed; *h*, lower course of canal; *i*, Cerro Maravilla el Chico; *j*, Cerro Atlatongo.

a system of this type is particularly difficult to date, firm conclusions were not expected. To cite only one problem, the latest sherds found in any element of the system would prove that the element in question was in existence no earlier than this material but, depending on the circumstances, would not necessarily indicate that it was not brought into being later, since later material simply might not be represented for a variety of possible reasons.

The first excavation within the system was a cut made across the bed of the canal a short distance southwest of the canal intake (Fig. 2 *g*). The central portion of this cut is represented in Figure 3. It will be seen that on the down-valley side of the canal (to the left of the canal bed in the drawing) a thin layer of sand and silt separates the 2 layers of loam in the upper part of the cut. No trace of this band of sand and silt exists on the up-valley side of the canal, and the division between the 2 layers of loam appears only briefly, on the right bank of the canal. Deposits on the up-valley side are consistently shallower than those on the down-valley side and since it is here that the land begins to rise noticeably towards the severely eroded slopes of Cerro Maravilla el Chico (Fig. 2 *i*), it is possible that erosion and subsequent plough action have obliterated any layer distinctions which might once have existed on this side.

In any case the band of sand and silt on the down-valley side of the canal bed seems clearly to be related to the canal. Presumably it was deposited as the result of overflows from the canal when it was filled or nearly filled with sand and silt. The existence of this layer makes possible the separation of the ceramic material found above it from that found within and below it. Preliminary study of this material, which was particularly abundant, suggests that the canal was in use during late Aztec times.

An interesting by-product of the canal excavation was the discovery of a hammered copper needle, 85 mm. long, apparently identical with certain of the specimens found in the Tarascan area (Rubín de la Borbolla 1944, Fig. 5 *b, center*). So far as I know this is the first time a metal needle has been found in an excavation in the Basin of Mexico. It presumably dates from the late pre-Conquest period. In method of manufacture the eye of the needle indicates that it belongs to Type 2 in the Aguilar classification (Aguilar 1946: 20).

The second cut reported on here was one made immediately to the south of Dam II and parallel to it (Fig. 2 *c*). It followed an inconclusive cut made through Dam II which revealed 3 different constructions, all of which are said to have been built during the last 20 years or so. It was designed to determine whether the present stream in the system formerly had flowed directly to the south of the existing dam. If it did this would suggest that it had been diverted from its old course to its present one by a dam, even though conclusive evidence for the former existence of such a dam was lacking.

It was expected that this cut would reveal 2 things: first of all, the channel near the surface said to have been caused by the breakthrough of the stream during the floods of 20 or 30 years ago; and secondly, at some distance below this, the old stream bed through which the stream had run before its diversion. What was revealed instead was a sequence of at least 6 stream beds (see Fig. 4 for cross section of this cut). The uppermost of these, Stream Bed 6, was the channel created during the aforementioned floods and contained a homogeneous deposit of tightly packed pebbles and sand. The

other stream beds, with the exception of Stream Bed 5 which was also homogeneous in content, contained a complicated succession of deposits of sand, silt, and pebbles characteristic of stream courses which have been running for some time. The distinctiveness of each of these stream beds suggests that they represent separate periods of deposition, each of which was interrupted by a period of indeterminate length during which water ceased to flow. Stream Bed 1 contains by far the thickest succession of deposits and apparently represents the material deposited by the stream after the initial period of erosion which produced the cut in the tepetate shown in the cross section. Two distinct periods of deposition may actually be represented within it but the evidence for this is inconclusive (see Fig. 4).

Very few artifacts were found in the entire cut — 60-odd sherds, the bulk of which were fragments of plain wares, a finely flaked obsidian projectile point, and several other arti-

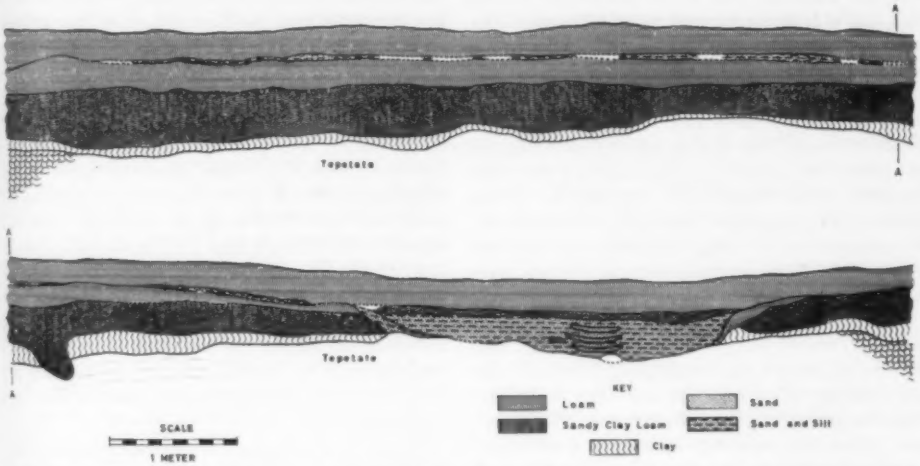

FIG. 3. Maravilla system, canal bed, central portion of cross section, southwest face. On the down-valley side of the canal (to the left of the canal bed) may be seen the band of sand and silt discussed in the text.

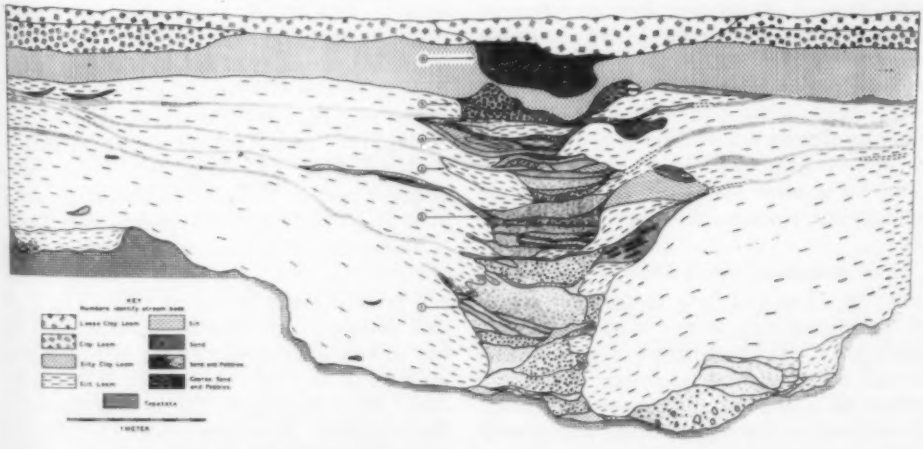

FIG. 4. Maravilla system, cross section of cut south of Dam II, north face, showing exposure of former stream beds.

facts of obsidian. More than half of the artifacts found were within Stream Bed 1 and its borders.

If the 2 stream beds expected had been found this would have suggested that the original diversion of the stream immediately followed the cessation of deposition in the lower bed. With a multiplicity of stream beds the situation becomes more complicated and much more difficult to interpret. It is clear, of course, that the stream formerly flowed to the south of Dam II. But if, as appears to be the case, each of these stream beds represent separate periods of deposition, how are the interruptions between successive beds to be explained? With so many interruptions man-made diversions need not be the explanation for all of them. The stream could have changed its course for natural reasons on one or more occasions even though the topography argues against this as a general explanation for the entire succession of beds. Another explanation for the apparent interruptions in stream flow represented in the cut might be successive periods of drought. Any such periods of drought, however, would have to be totally without rain and would have to last sufficiently long to cause the creation of a new stream bed above the previous one when the rains returned. Whether any of the interruptions in stream flow represented in this cut are due to such periods of drought cannot be known. It seems unlikely, however, since the maximum period of time which could be involved in the formation of these deposits is relatively short, Teotihuacán artifacts having been found in Stream Bed 1. Protracted periods without rain are unknown in the Basin of Mexico since the Conquest. What may have occurred before the Conquest is not known, but it is evident from the amount of time involved that periods of this nature could not account for all or even most of the interruptions in stream flow represented in the cut.

Thus it seems improbable that the entire succession of stream beds represented in this cut could have been formed by natural means, despite the inconclusive nature of the cut made through the present dam. At least some, and perhaps all, of the interruptions which the profile indicates as having occurred, would seem to be due to artificial rather than natural causes. What seems to have happened is that an initial diversioin was made, perhaps marked by the separation between Stream Beds 1 and 2. The dam creating this diversion was destroyed and the stream resumed its natural course once again. At least several times thereafter other dams were probably built and successively destroyed with the stream each time returning to its old course.

The dating of the deposits in this cut is obviously vital to its interpretation, but is more than ordinarily difficult owing to the scarcity of artifacts. The material from Stream Bed 1, though for the most part nondescript, does not appear to postdate the Teotihuacán period. Several of the sherds seem to be of the Archaic or Formative period and none were identifiable as later than the Teotihuacán period. On the other hand only 2 artifacts are clearly of the Teotihuacán period, one sherd and the finely made obsidian projectile point mentioned previously. Definitely post-Teotihuacán material does not appear until Stream Bed 4. The deposit overlying Stream Bed 6, which is known to be recent, contains the only sherds in the cut identifiable as late Aztec (Aztec III). The other sherds found in the upper portion of the cut, while all apparently post-Teotihuacán in age, are not distinctive except for one typical Mazapan Red-on-Buff sherd.

Clearly it is impossible to draw any sure conclusions on the basis of such limited evidence. The most that can be said is that the stratigraphic evidence and the artifacts taken together suggest that the original diversion of the stream occurred in early post-Teotihuacán times, probably no later than the Tula period. There is a possibility of an earlier diverson, perhaps in the late Teotihuacán period.

The map in Figure 1 locates the major canals in use in the central part of the Valley of Teotihuacán today. The lower part of the Valley does not appear in Figure 1 because the aerial photograph on which the map is based ends at Tepexpan. Aerial coverage of the remainder of the Valley and of the entire Basin of Mexico will become available during 1957. The 2 canals passing to the west of Acolman and the one passing immediately to the east of it were in existence in 1580 (see map in Paso y Troncoso 1905, following p. 208, also published in Nuttall 1926). The absence from the 1580 map of the Maravilla system and other now abandoned systems in the northern part of the Val-

ley is not necessarily significant since only the major canals in the Valley are illustrated on the map, even the natural streams to the north and east being omitted.

The stream in the Maravilla system presently empties into the Canal de San José system in the western part of the Valley. The canal in the Maravilla system probably also emptied into the San José system, assuming that the latter was in existence when the canal was in use. If the present course of the stream in the Maravilla system was created as early as suggested above, it would have been in existence for a considerable period of time before the building of the canal in the system. This may indicate that after its diversion the new stream itself served as a canal and continued to do so until it had carved out a bed so deep that its waters could no longer be drawn off for irrigation. (It runs through a deep ravine through much of its lower course at the present time.) When its bed was so deep that its waters could no longer be drawn off, the canal and Dam III may have been built.

In addition to the Maravilla system, 2 other abandoned irrigation systems have been located in the northern part of the Valley. One of these, the San Marcos system, was discovered by stereoscopic examination of aerial photographs of the Valley. It is a small system comparable in scale to the Maravilla system and is situated to the west of it (see Fig. 1). Like the Maravilla system it flows into the San José system. At the head of it are the remains of what appears to have been a reservoir with earth walls which seems to have served much the same function as Dam I in the Maravilla system, though on a much smaller scale.

The other system discovered is to the east of the Maravilla system, on the lower slopes of Cerro Malinalco. It was discovered by chance during a reconnaissance of the area inspired by the presence on an aerial photograph of what appeared to be a canal to the north of the system actually discovered, but which proved not to be. This system, to which the name Malinalco has been given, appears to be smaller than the other 2 abandoned systems to the west of it but was not traced in detail. It consists of the remains of a small earth dam from which stem several canals (see Fig. 1). One of these canals follows a straight course for some distance south of the dam. Neither of these systems appears to have any great antiquity but this can only be determined by excavation. Both of them are in areas of shallow and poor soils and, like the Maravilla system, neither of them could have irrigated large amounts of land.

Another small network of abandoned canals has been found in the central part of the Valley, north of San Lorenzo. It is not indicated on the map. For the most part these canals seem to be abandoned subsidiaries of the San Antonio system.

Aside from a cut through Dam I which had not been completed when this preliminary report was prepared, no further excavations are planned within the Maravilla system. Future excavations will be concentrated in the central part of the Valley. A test cut already made in the north bank of the Canal de San José immediately north of Atlatongo indicates that excavations in the central area are much more likely to be productive in terms of solving the problem of the antiquity of irrigation in the Valley than any further digging in the abandoned systems to the north. Excavations were not begun in this area from the outset because of difficulties standing in the way of excavation in this part of the Valley. It is now evident that these obstacles are not as formidable as first thought.

In sum, the excavations so far undertaken in the Maravilla system suggest that it is pre-Hispanic in age. The evidence from the cut south of Dam II further suggests that the system may have had its origins during the Tula period or perhaps in late Teotihuacán times. The system itself, whatever may be its age, implies the existence of earlier systems in the central flatlands to the south. Future excavations in this central area should shed considerably more light on the antiquity of irrigation in the Valley.

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MEXICO CITY
February, 1957

FREDERICK HUNTINGTON DOUGLAS

1897-1956

To assemble the facts pertaining to the life and work of Frederick H. Douglas is a relatively simple matter. To attempt to tell of the multifaceted personality whom hundreds knew and loved under the name "Eric" is a formidable task. No one person can do justice to it; selecting 10 friends at random, 10 entirely different facets might be illuminated.

The facts can be summarized briefly. Eric was born in Evergreen, Colorado, on October 29, 1897. He was the son of Charles Winfred and Mary Josepha (Williams) Douglas. Various childhood influences were to be strongly reflected in his later life. At an early age he accompanied his parents on trips into the Southwest and began to develop his lifelong interest in the Indians and their art. His father, a Canon in the Episcopal Church, was a well known musicologist and organist who adapted Gregorian chants for use in the Anglican Church and composed hymns, and his mother was a talented pianist. Devotion to the Church and a profound love of music, which found expression in the playing of the piano and the organ and the collecting of fine recordings, characterized Eric's whole life.

After a brief period as a private in the Infantry in 1918, Eric was graduated from the University of Colorado in 1921. From 1921 until 1926 he did postgraduate work at the University of Michigan and the Pennsylvania Academy of Fine Arts. In 1926 he married Freda Bendix Gillespie. She and 3 children, David, Ann Pauline (Mrs. John A. Maher), Eve (Mrs. Wallace Jolivette), and 4 grandchildren survive him. From 1926 until 1929 Eric's primary concern was with painting and wood carving, and, in 1928, accompanied by his wife, he embarked on a trip around the world, painting in each country that he visited. During this period he began some of the collections to which he was to devote so much of his time in the ensuing years. One of his major hobbies was the collection of Japanese prints. He also collected outstanding examples of Balinese wood carvings, textiles, both Oriental and Early American, and rare books, as well as many examples of American Indian arts and crafts.

In 1929 Eric joined the staff of the Denver Art Museum and until the time of his death he continued to be associated with this institution to which he willed most of his collections and the bulk of his magnificent anthropological library. The section of the library dealing with sex was given to the Institute For Sex Research at Indiana University and certain dictionaries and books on philology were given to the Denver Public Library. In 1940 Eric became the Director of the Denver Art Museum, but his interests did not lie in the administrative field and, after 2 years, he decided to devote his time to the study of material culture, the collecting of native art, and the development of new museum techniques. Until 1947 his title was Curator of Indian Arts; after that date he became Curator of Native Arts. He also served as Commissioner of the Federal Arts and Crafts Board and as a trustee of various museums. Not only through his own work, but through the help and counsel that he gave so generously to others, he made major contributions to anthropology and museology.

Among Eric's outstanding achievements in the field of exhibition were the planning and installation, in cooperation with René d'Harnoncourt and Henry Clumb, of the Federal Government Exhibit at the San Francisco World's Fair and the similar exhibit at the Museum of Modern Art, which were landmarks in the field of museum display. He also performed an important service in reorganizing collections and exhibits at the Peabody Museum, Harvard University. Through publications, notably the material culture notes issued through the Denver Art Museum, and the important book, *Indian Art In The United States*, which he published with René d'Harnoncourt, he reached a still wider audience. As a lecturer at Harvard University, the University of Colorado, and the University of Denver, he stimulated and influenced many anthropological students. To thousands of people he brought a new concept of the American Indian through his Indian Style Show, which he presented more than one hundred times in various parts of the country. Beautiful examples of aboriginal clothing from the Denver Art Museum collections were modeled by local girls while Eric provided a running commentary on the dresses and the cultures which produced them.

From 1942 until 1944 Eric served in the United States Army in the New Hebrides and on Luzon, first as a Captain and later as a Major. He was discharged with the rank of Lieutenant Colonel. As registrar of the 31st General Hospital Unit he was the commanding officer of 130 nurses whom he welded into a group with an *esprit de corps* that the Marine Corps might have envied. After the war the unity of the group was amazingly preserved by a round robin of letters, which reached the dimensions of a book, and by yearly reunions in various parts of the country. Every 2 years there was a national reunion. Sixty-four members of the group attended the gathering held at Troutdale, Colorado, 2 years before Eric's death.

It was during his service in the South Pacific that Eric began to write poetry. The manner in which he wrote his poems, predominantly sonnets with a markedly Elizabethan quality, was something that neither he nor anyone else could fully understand or explain. They came to him full blown, perfect in form, and were written in a matter of moments with none of the work or effort usually involved in the production of poems in this demanding verse form. He published them in 5 volumes under the revealing title, "The Inner Light."

With tremendous courage Eric continued his work despite the amputation of his left arm, intolerable pain, and the knowledge of imminent death from cancer. During the last summer of his life he prepared 10 material culture notes for publication in the Denver Art Museum Series and on every day when it was possible he worked on the Museum collections. Only 2 months before his death, which occurred on April 23, 1956, he went to Berkeley to serve as a consultant in the planning of the building and the exhibits for the University of California Anthropological Museum.

Few people have had so profound an influence on the museum world and Eric received many honors. He was awarded the degree of Doctor of Science by the University of Colorado in 1948 and shortly before his death the Regents of the University presented him with the recognition medal which is given at infrequent intervals to citizens who have made great contributions to the cultural development of the state. In 1946 he was one of the 10 museum men invited by the Swedish Museums Association, under the sponsorship of the Swedish Government, to tour the museums of the country. In February, 1956, he was named honorary Curator of the American Indian section of the Nelson Rockefeller Museum of Native Arts in New York. His tremendous ability and the magnitude of his accomplishments brought recognition in many other forms. Eric's greatest memorial, however, lies in the hearts of those who knew and loved him.

H. Marie Wormington

FACTS AND COMMENTS

SUGGESTED CHANGE IN NOMENCLATURE OF THE MAJOR AMERICAN TIME PERIODS

In the *Handbook of Texas Archeology* by Suhm, Krieger, and Jelks, 4 major time periods are defined under the terms, "Paleo-American," "Archaic," "Neo-American," and "Historic."

I can see no reason to use the element "American" in the names of time periods in Indian prehistory. Strictly speaking, "American" can be applied to any inhabitant of North, Central, or South America, past or present. But popular usage restricts the term "American" to the people of the United States, and unless qualified, often further restricts it to the whites only. Similarly, "Indian" denotes the peoples who inhabited the Americas before the invasion of the Europeans, and their present day descendants. Whether the earliest peoples on these continents were of the same genetic stocks as the latest is immaterial. "Indian" may be a misnomer, but it is one of respectable antiquity, used since 1492.

The term "Archaic" is nothing but a catchall, nondescriptive and indefinite. In the United States and C[illegible], this term denotes only that the people being discussed did not make pottery or raise food crops. In other parts of the Americas, "Archaic" has different meanings.

The term "Woodland," as originally used in the Eastern United States, refers to a particular habitat area, and is now inappropriate. "Woodland" cultures are now recognized on the treeless prairies and in the Arctic. All this term now means is that the people made pottery and raised food crops, or at least made pottery.

I suggest that, in the future, we use the following more logical terms for these 4 major time periods, or culture stages: *Paleo-Indian*, *Meso-Indian*, *Neo-Indian*, and *Historic*.

Paleo-Indian is now firmly imbedded in the literature. It is a better term than the now outmoded "Early Hunters," for it can include groups that were not hunters of big game.

Meso-Indian is a new term which I have never seen used. It is self-explanatory, the Indians of the middle period, and it is parallel, in this scheme, with the Mesolithic of Eurasia and Africa.

Neo-Indian has been slightly used in the literature, and it has the great advantage of including all the pottery making, food raising cultures of all the Americas under one heading.

Historic begins with the time that contact with white cultures can be demonstrated in any area, which contact was usually followed by degeneration of the Indian culture.

These major periods can be subdivided into Early, Middle and Late, for greater exactness, as is done with the presently used terms. It is time that archaeological nomenclature was systematized, and this is a suggestion to that end.

ARTHUR GEORGE SMITH
The Firelands Museum
Norwalk, Ohio
March, 1957

COMMENTS ON GILA POLYCHROME

In the October, 1956, issue of AMERICAN ANTIQUITY (pp. 180-3) an article appeared by Edward B. Danson and Roberts M. Wallace entitled "A Petrographic Study of Gila Polychrome." The authors imply that up to the time of their publication Southwesternists assumed that Gila Polychrome was traded from one small area (Roosevelt-Tonto Basin) to all other regions. As far as I know this idea was restricted to those who adhered to Gladwin's hypothesis of the Salado culture. They even quote a statement of mine (1952: 330) out of context to support their point.

In extracting this statement from my article, they completely overlooked an important point on the page preceding the above-mentioned quotation, wherein I pointed out that there were 2 kinds of "Gila Polychrome" in the Salt and Gila River areas of southern Arizona. I stated, "visual examination of the paste reveals a temper different from local Salt or Gila River products, *except for an occasional poor copy*" (italics added). This was followed by a discussion of Sinagua ceramics — the lack of decorated pottery, and the practice of importing decorated pieces from neighboring groups. I concluded by stating, "in the light of the Sinagua practice of importing decorated pottery and the increasing dominance of their culture over that of the Hohokam during the Classic period, *Gila Polychrome need not be considered a product of a Salado influx* [italics added], especially since other evidence does not support such a migration."

Immediately following the above I made the statement (1952: 330) which Danson and Wallace quoted, "the variability of occurrence and association of Gila Polychrome, *not only in the Gila Basin but in other areas as well* [italics added], might also be considered, along with the lack of an associated related utility type, in establishing this pottery type as an intrusive rather than a local article of manufacture." Following this they inserted "[in the Gila-Salt Basin]." It is obvious, as can be seen from the italicized statement within the quotation that I did not restrict this statement to the Gila-Salt River area. Moreover, I was pointing out that regardless of the area of occurrence, "Gila Polychrome" could be distinguished as an intrusive on the basis of "the lack of an associated related utility type." It was on this basis that I decided that one of the 2 kinds of "Gila Polychrome" in the Salt had been locally made.

This was reemphasized the following year (1953: 79) when I stated, "I believe the scrape-decorated types in the Gila Basin, *ascribed to the Salado* [italics added], were trade pieces since scraped-plainware is lacking." The point of all this is that the presence or absence of a related utility type *must* be considered in order to determine whether or not "Gila Polychrome" is indigenous or intrusive in any given area.

I am in no way attempting to belittle the work of Danson and Wallace. Their analysis, as they stated in closing, provided an answer to Haury's remark (1945: 64), "whether Gila Polychrome was actually made at

Los Muertos or in any ruins of the Gila-Salt is still a debatable point." Instead of disproving my contentions of 1952 and 1953 (that one of the 2 kinds was intrusive in the Gila-Salt), as they suggest in their final remarks, they have exposed flaws in their methodology.

Obviously the samples of 5 sherds from each of the 5 areas they were concerned with were too few to be of much value. The results of their analysis indicate that their sample from the Gila-Salt did not contain any sherds representing the second of the 2 kinds of "Gila Polychrome" reported in my article of 1952. They also state there was some uncertainty as to whether the samples from Gila Pueblo, near Globe, were locally made. At the time they obtained their sample from this site, it was not known that at least 2 kinds of "Gila Polychrome" existed in the region, a fact recently brought to light during an archaeological survey conducted by Raymond Brandes southeast of Globe. This again demonstrates that their sample was too small, as only one type was indicated by their analysis.

Petrographic studies can be a valuable aid toward the solution of certain ceramic problems in the Southwest and we are grateful to geologists such as Wallace who contribute their time to studies of this type. However, we must be as cautious with the findings presented by petrographich studies as we are with data obtained from dendrochronological, radiocarbon, and other fields of research. *The archeological material must be considered in context.*

We now know that the following cultural factors in the case of "Gila Polychrome" can determine to a great extent whether or not the pottery was local or intrusive. If the vessel walls were thinned (paddled, scraped, or hammered, this last having been described by Lyndon L. Hargrave at the 1956 Pecos Conference) by the method employed by the local inhabitants for other pottery, one can postulate that the pottery was manufactured within the over-all area employing the thinning technique favored locally. If, in addition, the paste and temper resemble that of other associated indigenous pottery types at the site, we may then assume, with little doubt, that the type under consideration was made locally. Should the paste and temper differ, then a petrographic study can help to limit the possible areas of origin. Moreover, as the authors of the above-mentioned article pointed out, such an analysis *does not prove* that the sherds analyzed were local products. It merely indicates whether or not they *may* have been made locally. In the end we must rely upon those cultural factors involved, wherever possible, to determine the cultural association of a pottery type, rather than petrographic analyses.

Our most pressing need now is to redescribe the various types of pottery decorated in the Gila Polychrome style, particularly since Danson's and Wallace's paper indicates that several kinds of Gila Polychrome exist. This is necessary before we will be able to determine the associated utility ware, by means of which the range of each type can be outlined and the cultural assignment of each established. Once again the ogre, representing the need for and the value of splitting pottery types in the Southwest, has reared its ugly head!

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ALBERT H. SCHROEDER
National Park Service
Globe, Arizona
January, 1957

THE EAST RIVER AND WINDSOR ASPECTS: A REPLY

Robert C. Suggs (1957) invites comment on his criticism of some of my interpretations of the prehistory of coastal New York and Connecticut (Smith 1950). After submission of his paper for publication Suggs discussed the problem with me on 2 occasions in 1956: Once in Papeete, Tahiti, in May, and again in the Marquesas, in July. While I do not recall the details of our discussion in those exotic surroundings, it is my recollection that we found ourselves in closer agreement than his published critique would imply. Perhaps the distance between Polynesia and the area under consideration was a contributing factor.

My primary reason for attributing the cultural characteristics of the East River aspect to a migration rather than to diffusion was because I could not find a site that indicated a transition from the Clearview focus of the Windsor aspect into the Bowmans Brook focus of the East River aspect. The disturbed nature of the Clearview site precluded using it to support such a transition. I am still convinced that my division of collections from other sites into 2 or more components will stand the test of future work. If a transitional site is found I would favor diffusion rather than migration as an explanation. It is the abrupt change combined with the marked difference between the Bowmans Brook focus and the contemporary Windsor components farther east that makes me favor the migration hypothesis. Sites near the boundary between the East River and Windsor aspects, such as the Manakaway site, might be expected to share traits with both.

I did not derive the East River aspect from New Jersey in order to account for the similarities between the Clasons Point and Rosenkrans Ferry foci, 2 contemporary manifestations. The origin of the East River aspect must lie in earlier cultures in New Jersey (Smith 1950: 152-3), unless the similarities are attributable to diffusion from a common source as Suggs suggests.

In studying the collections from sites on Long Island, before correlating the data with the mainland, a difference between the late foci on the west end and the late foci on the east end was recognizable. It was also noted that the early foci in the west bore strong resemblances to foci in the east regardless of their temporal positions there. The terms East River aspect and Windsor aspect proved to be useful in expressing these differences and similarities taxonomically. The 2 aspects are differentiated largely, but not entirely, on the basis of ceramic traits. If Suggs thinks that the 2 aspects are more closely related let him demonstrate that they should be assigned to the same phase instead of 2 different phases.

My derivation of Clasons Point Stamped from Sebonac Stamped was based upon the fact that scallop shell stamping is prevalent on eastern Long Island in the Sebonac focus which overlaps the sequent Bowmans Brook and Clasons Point foci in time. Scallop shell stamping is absent in Bowmans Brook and Clearview, appearing only in small amounts in the Matinecock Point component of the North Beach focus in western Long Island. It seems logical to conclude that this technique spread from the east to the west, arriving after Bowmans Brook had changed into Clasons Point. At the time level of the Bowmans Brook focus of the East River and Windsor aspects differ profoundly. By the close of the Clasons Point focus they share many traits.

I may be guilty of misusing the McKern classification, but not without warning the reader (Smith 1950: 100-1). I placed the components in chronological order by stratigraphy and seriation in reference to certain ceramic techniques before I applied the McKern classification. Because the sequence was worked out first, reference in the text to the foci as temporal units was unavoidable. One of the defects of the McKern classification, or any classification, for that matter, is that transitional sites cannot be fitted into previously established taxonomic units. If the Manakaway site does not fit into one of my taxonomic units there is a need for the definition of a new unit or the revision of an older unit.

The only fundamental difference between Suggs's interpretation and mine is in the selection of diffusion instead of migration to account for the same facts. If Suggs will demonstrate that diffusion can account for the appearance of such a distinctive manifestation as the Bowman Brook focus, a perplexing problem will have been solved.

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SHANTOK INFLUENCE ON EASTERN LONG ISLAND

Carlyle Smith, on pages 159-62 of *The Archaeology of Coastal New York*, groups 2 historic sites, Pantigo and Fort Corchaug, on eastern Long Island with 2 historic Connecticut sites, Shantok and Noank, in what he calls the "Shantok" aspect, following the taxonomic scheme of McKern (1939). After some deliberation, I find myself believing that, while on the face of it, the connections between Fort Corchaug and Pantigo may seem plausible, actually a substantive basis for the connection is relatively meager.

Before discussing the reasons for my disagreement, it should be noted that Smith uses the concepts of the direct historical approach (1950: 100) and ceramic traditions (1950: 111-2), as well as the McKern classification system. He comments upon his use of the latter, "The use of the McKern classification does not imply that I have followed its methodology. Most of the foci are interpreted as developmental stages within each of the aspects and not as taxonomic units devoid of temporal significance. Time perspective was established by a study of the pottery before the classification was applied" (1950: 99-100).

Smith appears to show a historic continuity from Noank to Shantok in Connecticut, to Fort Corchaug, and finally Pantigo on Long Island. There is a chronological range from very late prehistoric or precolonial to around 1750. While the archaeological and historical basis for the connections among the first 3 sites seems to be in order, the reasons for putting Pantigo in the sequential relationship are in my opinion less well justified.

Pantigo is the name which Smith gives to a Montauk cemetery reported by Foster H. Saville (1920). This site is on the upper part of Pantigo hill about 2 miles east of Southampton. This cemetery is documented and dated by trade goods and coins, bracketing it from "the latter part of the seventeenth century to the early part, if not the middle, of the eighteenth century" (Saville 1920: 74). Fifty-eight skeletons were taken out of the excavated area, which measured 70 by 105 feet. Presumably the first burials were made about 1660, when a smallpox epidemic among the Indians caused the town fathers to forbid the use of the traditional Montauk cemetery within the town limits. The Pantigo hill cemetery was rich in trade goods, which indicates the dependence of the Montauks upon the white settlers for a good share of their economy. Aboriginal material was conspicuous by its relative paucity. Smith places great weight upon 2 aboriginal vessels to support the claimed connection between Corchaug and Pantigo (Smith 1950: 111).

Fort Corchaug is an early- to mid-17th century site situated in Cutchogue on the northern fork of eastern Long Island, about 9 miles across Peconic Bay from Southampton. Test excavations of this site formed the basis of my 1950 report. The fort itself appears to date from the period just following the war with the Pequot Indians in 1636, or about a decade after this date. Fort Corchaug was one of 5 contemporary Indian forts on eastern Long

Island (Solecki 1950, Fig. 1). Although these forts were known in historic times, unfortunately, only Fort Corchaug has been located.

Fort Shantok was an early 17th century Indian fort site situated near Norwich close to the Thames River in eastern Connecticut. It was built early in the years of European contact by the Mohegan after they had separated from the Pequot, the English supposedly helping in the construction. The site, explored by local archaeologists, yielded many trade goods and the very distinctive Shantok pottery. Although well documented in the historic records, the full details of the fortification construction and the archaeological material recovered are not yet available (Rouse 1945: 5-6; 1947: 14, 21-3).

Cultural connections between Fort Corchaug and Fort Shantok are amply demonstrated by both archaeological and documentary means, one bearing out the other (Rouse 1945, 1947; Solecki 1950). We know that the eastern Long Island Indians helped the English defeat the Pequots, and in return, they received captive Pequots as vassals. We can well assume that the survivors of the Pequots were preponderantly women, and that Pequot men did not do so well in captivity (Gardener 1636: 138). It must be emphasized that the influences at Corchaug were not that of the conquerer, but that of the vanquished Pequots, who were the presumed direct carriers of the Shantok ceramic style (Rouse 1945: 6-7, Fig. 2). It is my guess that a remnant of the Pequots were held in subjection at Fort Corchaug. At any rate, the aboriginal ceramics of Fort Corchaug were tastefully done in Shantok style, with some local cultural differences (Solecki 1950: 22).

Before examining Smith's proposition for grouping the Montauk cemetery at Pantigo hill with Fort Corchaug and Fort Shantok, let us briefly examine the historical record. Smith (1950: 109) believes it significant that both Fort Corchaug and Pantigo are dated as post-Pequot War. While this is quite true, I believe it is more significant that there was another war, the Narragansett War, which had serious repercussions upon the Montauks, intervening chronologically between the time of Fort Corchaug and Pantigo. In fact, the Montauks appear to have suffered more than any other native Long Islanders from this war. Fort Corchaug and Pantigo were definitely not contemporaneous. The dates for these sites are separated by as much as 100 years (around 1650 for Fort Corchaug and around 1750 for Pantigo). There must have been great cultural disparity between the Indians of these dates, since toward the end of this period the aboriginal culture of the eastern Long Island Indians was waning, being replaced by an alien culture and people (Jefferson 1940: 25-6).

Regarding the archaeology, a review of the trait table of the "Shantok Aspect" (Smith 1950: 113-6) shows that with few exceptions, the traits represented at Pantigo are absent from Fort Corchaug and Fort Shantok, and the reverse. Furthermore, the archaeological remains from both Fort Shantok and Fort Corchaug are more parallel in cultural context than between either of the two and Pantigo. For instance, wampum manufacture, a highly important economic trait, is represented at Shantok and Corchaug and not at Pantigo. Actually, getting down to cases, these sites represent only "part" cultures as defined by McKern (1939: 310-1), and not ideal "communities." As McKern (1939: 311) states, "Any classification based, for example, on data collected exclusively at burial sites is subject to greater error, and is therefore less useful than if the determinants represent a community as manifested at both habitation and burial sites."

Regarding the artifacts, Smith (1950: 112) says that the European trade goods from Fort Corchaug are closer to Fort Shantok than to Pantigo. This is as it should be. That trade goods were more numerous at Pantigo is understandable; but dealing with European trade goods to settle the affinities of archaeological contexts does not give us a reliable index. Trade pipes manufactured by the same kiln in 17th century Hull, England, were smoked over much of the eastern seaboard. If one were to discount the historic trade goods from the 3 sites, Pantigo, Shantok, and Corchaug, one would be left with only a handful of aboriginal items as Smith (1950: 113-4) records. In fact, the problem is in the realm of ethnohistory.

Smith places his greatest weight for cultural connections between Pantigo and Shantok-Corchaug upon 2 cup-sized vessels of aboriginal manufacture, which he places in the category, "Unclassified, Shantok Tradition" (Smith 1950: 114). These vessels are illustrated in Saville (1920, Fig. 1 *a*, *b*). They consist of 2 fairly complete pots, one 5¾ inches high, and the other 2⅝ inches high. They seem to be too small for cooking vessels. Both pots are flat bottomed and straight sided, or cylindrical in shape, with round mouths. Both vessels are of coarse, light-brown ware, cracked and fissured as though made by hands which had forgotten the art of turning out good pots. Both vessels have a row of nodes encircling the vessel below the rim. There is a knoblike handle applied directly on the rim of the larger vessel. The smaller vessel has a broken-out portion on the rim. Whether or not a handle had been present at this point of the pot cannot be determined. The circumstances and the exact provenience of these finds in the cemetery area at Pantigo were not given. One small stray potsherd was also recovered from Pantigo.

The 5 metal kettles found certainly served the purposes of cooking pots. Glass bottles and various European trade pottery and glass receptacles were also recovered from Pantigo, all of which made the manufacture of native pottery unnecessary.

The Fort Corchaug vessels were generally large cooking pots, globular in body shape with square or oblong mouths, and collared, with rim points at each of the 4 corners. One smaller Corchaug vessel has a rather flattened base and weakly sloping sides. The treatment of the decoration of the Corchaug vessels is quite unlike that of the Pantigo examples (Solecki 1950: 22-6, Figs. 11-13). There are some local differences between the ceramics of Shantok and Corchaug, but in the main, the resemblances are close. Contrary to what Smith (1950: 190) says, true bossing, or impression from the inside to form nodes, was found at Fort Corchaug on 2 sherds

(Solecki 1950: 24). The nodes on the Fort Corchaug pottery were made differently from those at Pantigo, and the mode of decoration on the nodes is very unlike those at the latter site. Smith (1950: 111) says that the lug handle on one of the Pantigo vessels is a "rim point," implying that it has a relationship to the rim points of the Corchaug pots, which I would dispute. Saville (1920: 88) calls it a "knob-like handle," projecting on the top of the rim. The Corchaug and Shantok vessels were shell tempered; no shell temper was visible in the Pantigo vessels (Smith 1950: 160).

Taking everything into consideration, I would hesitate very definitely to include the 2 vessels from Pantigo in the Shantok-Corchaug "tradition," which incidentally, may be more aptly termed a "style." The Pantigo vessels are unlike pottery noted anywhere else on Long Island. The only basis for relationship might be the rim nodes — but this is not enough evidence on purely typological grounds to put Pantigo and Shantok-Corchaug in the same scheme. To be exact, the pyramidal node rather than the circular node of Pantigo is the style at Shantok and Corchaug.

In conclusion, the Pantigo burial ground appears to be a pure Montauk site without convincing traces of Pequot influences. The great preponderance of European trade goods recovered indicates that the effect of acculturation was inexorably making itself felt. Forts Corchaug and Shantok, on the other hand, have indisputable links in the same ceramic style which is attributed to the Pequot, as well as in the historic record of the early and middle 17th century. The wampum making industry, which characterizes both fort sites also, marks an important economic feature among the colonies of that era.

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June, 1956

REJOINDER TO KRIEGER, SUHM, AND JELKS

In the January issue of AMERICAN ANTIQUITY (Vol. 22, No. 3, pp. 310-5) Alex D. Krieger, Dee Ann Suhm, and Edward B. Jelks have replied to my critical review of their publication, "An Introductory Handbook of Texas Archaeology" (*Bulletin of the Texas Archaeological Society*, Vol. 25, Austin, 1954) in very strong and highly personal terms. It is a temptation to reply in similar terms but it is probable that no useful purpose would be served by such action.

Essentially, Krieger, Suhm, and Jelks argue that my criticisms of their Handbook were based primarily on my unpublished researches, which, owing to my long-term negligence in publication, were unavailable to them. It is quite true that publication of my Texas researches has been, at least in part, long delayed. However, to the best of my knowledge then and now, all of the specific criticisms of the Handbook included in my review were based on published materials — so that this argument is without validity. Furthermore, I have consistently made my unpublished Texas research materials freely available to all serious students, including in the past both Krieger and Jelks, and would gladly have done so as an aid in the preparation of the Handbook, had such aid been requested.

Paradoxically, Krieger, Suhm, and Jelks state in their reply that they did not include in the Handbook the available data regarding the alluvial chronology for central and western Texas because it was already available in published sources, and they imply, mistakenly, that this alluvial chronology was developed by me, which is not the case.

Professional users of the Texas Handbook — and there should be many of these since the book has much merit — should resolve for themselves the questions invoked by the reviews of Stephenson and the present writer and the reply of Krieger, Suhm, and Jelks by comparing the Handbook closely with the sources employed in its compilation. Surely the Handbook authors can have no objection to such a procedure, which should fulfill adequately the original function for which the reviews were written, and justify or negate the objections raised by the reviewers.

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EVIDENCE FOR PRE-COLUMBIAN GOITER IN GUATEMALA*

Detailed medical surveys recently concluded have shown Guatemala, and particularly the Guatemalan highlands, to have one of the highest incidence rates for endemic goiter in the world (Muñoz, Pérez, and Scrimshaw 1955a: 36-43; 1955b: 963-9). At the present time only the tropical and sparsely populated northern Department of Petén is without goiter as a serious public health problem. The incidence in the other departments varies from 21% to 68%.

It is now well established that endemic goiter arises as a result of the deficiency of iodine in the diet, which, in turn, is due to a lack of sufficient iodine in the water and soil on which food crops are grown. Mild goiter may be only disfiguring, but severe goiter is associated with high incidence of deaf-mutism, mental deficiency, and thyrotoxicosis. Cretinism is the most serious consequence.

As early as 1648 Thomas Gage (1928: 176-7) mentioned the existence of goiter in a large part of the population of Sacapulas, Department of Quiché. Since his description of goiter went unnoticed in the medical literature, it may be worthwhile to quote it in its entirety. Gage, traveling in 1628 from Comitán, Chiapas, to Guatemala City, stopped in the town of Sacapulas and made the following observation:

> . . . I found in an arbour by the water side the Prior of Sacapula himself with a good train of Indians waiting for me with a cup of chocolate. At the first sight I was a little daunted to behold the Prior, who looked most fearfully with a bladder from his throat swelled almost round his neck, which hung over his shoulders and breast, and stayed up his chin, and lifted up his head so that he could scarce look any whither but up to Heaven. In our discourse he told me that disease had been upon him at least ten years, and that the water of that river had caused it in him, and in many others of that town. . . .
>
> When I came to the town, I discovered many men and women with bladders in their throats like the poor Prior, which made me almost unwilling to drink there any chocolate made with that water, or eat anything dressed with it, until the Prior did much encourage me and told me that it did not hurt all but only some, and those who did drink it cold.

The incidence of goiter in the same town in 1955 was found to be 37%. Hidalgo (1798: 169) in 1798 stated that all the inhabitants of Jacaltenango in the Department of Huehuetenango had goiters. Shattuck's survey (1938: 179-84) considered goiter one of the great public health problems of Guatemala. The 1955 survey made by the Institute of Nutrition of Central America and Panama (INCAP) reported an incidence of 38% for the Department of Huehuetenango. There have been a number of subsequent reports of the occurrence of endemic goiter in Guatemala such as that of Dunn (1828: 256), but nowhere has mention been found of the occurrence of endemic goiter among the highland Indian populations of Guatemala prior to the observation of Gage in 1628, only a little more than 100 years after the conquest of Guatemala by the Spaniards in 1524.

Since it is unlikely that the soil and water in pre-conquest times contained any more iodine than today, it becomes a matter of considerable interest to determine whether or not goiter was present in pre-Columbian times and if not, to account for its apparent absence. With this in mind, collections of pre-Columbian figurines and effigy whistles of the Guatemalan National Museum and several private individuals were examined. Of several thousand figurines available from the highland and southern coastal areas of Guatemala only about fifty, all complete with torso, were considered suitable material for a goiter survey. The sample examined included 2 specimens, an effigy whistle and a solid figurine fragment, with swelling in the neck area which appeared to experienced medical eyes representative of goiter. On the other hand from the northern Maya area which includes the essentially goiter-free Petén and Yucatán (Muñoz, Pérez, and Scrimshaw 1955a, 1955b) of today, approximately a thousand unbroken or partially broken figurines and effigy whistles have been examined without goiter being noted.

Figure 1 *a*, *a'*, an effigy whistle estimated to be approximately 4000 years old, is one of the Las Charcas type. This earliest known archaeological phase in the central Guatemalan highlands is considered by Shook (1952: 14) to have lasted from approximately 2000 to 1800 B.C. The specimen was found in 1951 by Raúl Moreno, owner of Finca Copalché, and now forms part of his private collection. It was excavated by him near Finca Copalché in a bottle-shaped Las Charcas phase storage pit along with several other archaeological specimens, all of known Las Charcas type. The specimen is a nude, standing, female figure, 18 cm. in height, and may represent an early stage of pregnancy. The swelling in the neck occurs in the thyroid region and is plainly visible on both frontal and lateral views. The whistle is made of a coarse reddish brown ware, containing numerous small quartz particles. The figurine is covered with a well-polished chocolate brown slip, and has a mouthpiece which actually forms part of the elaborate coiffure. The central punched eye of the figure is characteristic of most of the Las Charcas figurines. It was found with the head broken off and is now restored.

The second specimen (Fig. 1 *b*, *b'*) is a small solid figurine fragment of the Miraflores phase, measuring 5.5 cm. in height. This archaeological phase is dated at 1000 to 500 B.C. (Shook 1952: 4). The figurine, representing a female, is made of a coarse, unpolished grayish ware containing many small quartz particles. It was found, along with other archaeological material, at La Zarca, Platanar, below Ayutla on the road to Ocós, Department of San Marcos, by E. M. Shook of the Carnegie Institution, in 1942. It is now in the collections of the Guatemalan Archaeological Museum (Lot No. K-19). The figurine represents a pug-nosed, puffed-cheeked individual, with slit eyes and long hair. Although the fragment consists only of the head and upper torso, the enlargement of the neck in the thyroid area is readily visible in both frontal and laterial views and suggests a goitrous condition.

* Scientific Publication 1-67, Instituto de Nutrición de Centro America y Panamá.

FIG. 1 [Borhegyi and Scrimshaw]. *a*, *a'*, effigy whistle, from Las Charcas, Guatemala City. Las Charcas phase. Height: 18 cm. *b*, *b'*, figurine fragment, from Ocós, Department of San Marcos. Miraflores phase. Height 5.5 cm.

The 2 archaeological specimens described would then suggest the pre-Columbian presence of goiter among the Indian population of the Guatemalan highlands. They do not necessarily indicate that goiter was endemic in pre-conquest times, since these might represent sporadic cases of a relatively infrequent condition. However, it is probably significant that despite the much larger number of relatively intact specimens available, no figures or effigy whistles with goiter were found from the northern Maya area where endemic goiter does not occur in modern times.

Though it is known that sea salt was an important basis for trade in pre-Columbian times between the coastal and highland Maya Indians, it should be noted that the iodine of sea water is almost entirely lost in the process of evaporation, the most frequent method of salt producing known in those days. It is known, however, that persons consuming significant quantities of marine food receive enough iodine to prevent the development of endemic goiter (Carson 1951: 188-94). There is considerable evidence from fish bones and beads made from fish vertebra found during the excavations at archaeological sites, as well as the representation of large fish on pre-Columbian pottery, murals, frescoes, and bas-reliefs, to suggest that marine food may have formed a much larger part of both highland and lowland Indian diet than at present. The fish can be identified as marine, since freshwater fish of this size are not ordinarily found in the area. There are also large numbers of shells, sting-ray spines, shark's teeth, and other material of marine origin that can be taken as further evidence.

Since recent dietary surveys in rural areas (Flores and Reh 1955) indicate that the amount of fish consumed by Guatemalan highland Indians at present is negligible, it appears probable that a great many more marine products were brought or traded from the sea coast to the highlands in pre-Columbian times than today (Shook 1949: 16). Although it is dangerous to indulge in too much speculation from very scanty material, it is important from a medical point of view to know that goiter did occur and was known in the Guatemalan highlands as far back as 2000 B.C. as represented by the 2 specimens described. On the other hand, the scarcity of goitrous figurines and the archaeological evidence indicating a greater consumption of marine products suggests that goiter may not have been as common then as it is now. It is possible that the settling of the Ladinos in the coastal areas after the conquest may have reduced the amount of iodine obtained from food of marine origin consumed by breaking up the traditional pattern of commercial exchange between Pacific-Atlantic coastal and highland Maya Indian groups.

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THE HAKATAYA CULTURAL TRADITION

During the 1956 Pecos Conference at the Museum of Northern Arizona at Flagstaff, a group active in the study of archaeological remains in the western Southwest met to perform one of the original functions of the Conference. Participants agreed upon some standard concepts with which to order existing knowledge of this western area and to clarify the tasks of future research there. Agreement was reached on the basic cultural content of a prehistoric cultural unit and its geographic distribution and name.

I have previously discussed the current terminology pertaining to the Lower Colorado River area (1952). Since that time I have felt, as have others, that the prevailing terms are inadequate and somewhat misleading. As a result, a number of us met in an effort to select a more acceptable general term for the culture unit involved. Participating in this conference were Henry F. Dobyns, Robert S. Euler, Paul H. Ezell, Michael J. Harner,

Clement W. Meighan, Albert H. Schroeder, Douglas W. Schwartz, and Dick Shutler, Jr.

Region. The prehistoric province discussed lies west of the territory inhabited by the Anasazi Indians dealt with at the original Pecos Conference. It is located between the Pacific Coast ranges on the west and the Mogollon Rim on the east, a portion of Lower California and Gila River marking the approximate southern margin, and the Tehachapi and the Transverse ranges of California and the Grand Canyon forming the approximate northern limits. Much of the area physiographically is part of the Great Basin, and the cultural complexes involved are expected to show both Great Basin and Southwestern features.

The catalog of characteristics which follows was based on the author's manuscript description of this archaeological unit. Three of the traits (trail shrines, gravel alignments, and hermetically sealed vessels) were added during the conference.

Cultural Characteristics

We agreed that Indians living in this region early in ceramic times were characterized by the following cultural traits (regional variations of which may characterize archaeological stems):

1. *Subsistence.* This was based on inundation (as opposed to irrigation) agriculture wherever seasonally flooding rivers or streams made it feasible, and upon wild food gathering and hunting. The principal animals hunted were small game — rabbits, rodents, and so on, deer and mountain sheep being available in certain regions only.

2. *Food Preparation.* Both meat and vegetable products were pit-roasted in stone-lined excavations which remain after use as stone-filled pits.

Cooking and eating utensils were clay vessels thinned with a paddle and anvil and fired in an uncontrolled atmosphere. These products were plain ware vessels ranging through gray and brown in color. Food was stored in such ceramic vessels, often hermetically sealed (Euler and Jones 1956).

Uncooked foods were reduced to edibility or cookability in a mortar, both bedrock and portable, with a pestle. Portable mortars were made from either wood or stone. A hand muller ("one-hand mano") was struck against food on a flat stone slab in similar percussion food reduction.

3. *Implements.* Percussion-flaked choppers were characteristic of this cultural tradition, in contrast to the axes prevalent in other parts of the Southwest. Stone arrowpoints were rarely employed.

4. *Settlement Pattern.* Individual household units were scattered and physical arrangement was unstructured (in contrast to the compact or contiguous form of Anasazi settlement). Housing (according to present archaeological knowledge) varied with the local environment of the particular groups of Indians. Riverine residents built square, 4-post-supported houses. Nonriverine Indians made circular or oval brush shelters without posts, which utilized the strength of branches, sometimes simply propped against a living tree and held in place by stones. The circular shelter may have been basic to all groups.

5. *Relations with the Supernatural.* Dead bodies were cremated, the ashes generally remaining at the cremation site, ungathered. Trail shrines were built up. Also, gravel alignments seem to have been, if not a universal, at least an alternative trait, made where local conditions permitted.

The Tradition

The traits just enumerated we take to define the Hakataya folk tradition, or in southwestern archaeological parlance, the Hakataya culture. The pattern of traits was culturally distinct from the Hohokam, Anasazi, and Mogollon. In introducing this new label, we aim specifically at rejecting the term *Yuman.* The prehistoric Indians of the Hakataya culture cannot, on the basis of present evidence, be considered as all having spoken Yuman languages, though the possibility remains. They inhabited a region larger than that held by historic Yuman speakers.

We seek also to relegate the terms *Patayan* and *Laquish* to a smaller subarea (possibly stems) within the Hakataya culture. Yuman had priority of publication over Patayan (Gladwin and Gladwin 1934). However, both Colton (1938) and Rogers (1945) pointed out that no adequate description of the archaeological characteristics included under this rubric was presented. Initially, Colton (1938) objected only to using the name of an historic Indian language group to label archaeological remains. He sought to substitute Patayan for Yuman, referring to the same artifacts.

Lyndon L. Hargrave, coworker with Colton, soon after (1938) completely changed the artifactual referents of Patayan. He used the word for a "basic culture," including the Prescott, Cerbat, and Cohonina branches, which extended from the San Francisco Peaks to the Colorado River and perhaps beyond it, and from the Grand Canyon to beyond Bill Williams Fork.

Colton (1939b) then inferred Patayan traits other than ceramic from Forde's (1931) description of historic Yuma technology. He made his inferences from a river dwelling tribe, rather than from an upland Arizona group, such as the historic Walapai (Kroeber and others 1935), Havasupai (Spier 1928), or Northeastern and Western Yavapai (Gifford 1936), who inhabited the "riverless" terrain of the prehistoric Patayan. After several years, Colton (1945) was committed to 2 branches of the Patayan, the Cerbat "centering about Needles," and the Laquish "centering about the delta area." The latter term he had borrowed from Malcolm J. Rogers. Rogers (1945: 179) rejected the Arizona-coined term Patayan for Pacific coastal remains. He also objected (1945: 180) to using the term to denote a cultural entity "when the material evidence indicates that it is made up of ceramic fragments from diverse cultural complexes," that is, Cohonina and Prescott. Returning to the term Yuman, Rogers proposed "four sub-areas of the *Yuman* complex: The

Colorado Valley, the Colorado Desert, the Western Area, and the Eastern Area."

Baldwin (1950), perhaps confused by the inconsistent application of the term Patayan, employed it for both riverine and upland cultural debris on or near the banks of the Colorado River.

Schroeder (1952) demonstrated that certain ceramic types classed in Tizon Brown ware by Colton (1939a) actually belonged in Lower Colorado River Buff ware, the characteristic ware of the Laquish or riverine area. Laquish was applied to the Colorado River from about Davis Dam south, not to the delta alone as by Colton (1945). This left Colton's Cerbat branch entirely upland in distribution. Schroeder went back to the grouping of the Cerbat, Cohonina, and Prescott branches into Patayan which Colton had abandoned and Rogers imputed. He also demonstrated at least some Lower Colorado River Buff ware types to have been produced by Mohave potters within historic times. This was confirmed by Kroeber and Harner (1955).

Despite this correlation of one historic tribe with prehistoric ceramic remains, the participants in the 1956 conference repeated Colton's original objection to using *Yuman*. The historic-prehistoric correlation has not yet been demonstrated throughout the area herein outlined. The group felt the need for an all-inclusive term that also would include related remains in southern California where the term Patayan has not been applied yet. By common agreement the term Hakataya, meaning Colorado River in the Walapai and Havasupai language, was selected, and I have adopted this term in a current manuscript wherein the eastern half of the area involved, cultural relationships, time elements, and other factors are considered more fully.*

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* At a meeting held at the 1957 Pecos Conference it was felt best to retain the name Patayan for this western area and to expand its definition. The author would like to emphasize, however, that he still feels strongly that a distinction should be made between the upland Arizona and the riverine (Colorado River) groups.

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Albert H. Schroeder
National Park Service
Globe, Arizona
January, 1957

FURTHER DATA ON PACIFIC COAST FIRED CLAY FIGURINES

Since publication in 1955 of a comment by R. F. Heizer and the present author concerning fired clay figurines in California (Heizer and Pendergast 1955), some additional data have come to light which are suggestive of a need for revision of views on the distributional pattern of this trait on the Pacific Coast.

In March of 1956 Roscoe Barkhurst of Tulelake, California, submitted to the author for analysis 2 fragmentary figurines which had been collected at a site near Sara, Washington, in 1932. Unfortunately, no data on cultural associations or stratigraphic position of the specimens within the site were available.

The fragmentary condition of the figurines makes analysis of form and decorative elements difficult, although it may be noted that Specimen 2 exhibits certain elements reminiscent of those occurring on figurines from Site 4-Hum-67 in northern California (Heizer and Pendergast 1955: 182).

1. Incomplete figurine (Fig. 1 a). Greatest length 22 mm.; greatest width 24 mm.; average thickness 9 mm.

Color: yellow. Gritty, micaceous clay. Decoration consists of a band of punctations running downward from right to left, with 2 similar bands intersecting it at roughly right angles.

2. Incomplete figurine (Fig. 1 *b*). Greatest length 25 mm.; greatest width 23 mm.; average thickness 6 mm. Color: brownish gray. Fine textured clay. Decoration consists of a vertical band of incisions at each edge, each band terminating in 2 vertical lines. A horizontal line bisects the vertical elements.

Despite the paucity of data on form and decoration which can be derived from analysis of these figurines, the specimens are of considerable importance in terms of their provenience, since neither Morss (1954) nor Meighan (1953) notes the occurrence of fired clay figurines in the Northwest Coast culture area. Archaeological research in this region also fails to indicate the presence of such figurines, and the trait is not noted in the culture element distribution studies of ethnographic groups (Drucker 1950). That the Sara occurrence is the first noted from the Northwest Coast culture area may be due to the difficulties involved in observing and recovering figurines during excavation and also to the possibility that these artifacts may be present in limited quantity. In either case, no figurines are known to have been recovered during systematic excavation of a site, so that no conclusions may be drawn here concerning the cultural context within which they occur.

The primary significance of the Washington figurines lies, however, not in their immediate cultural associations, but rather in their relationship to similar artifacts from other areas of the western United States. Despite the isolated nature of the Washington occurrence, it may be considered to bear directly upon the problem of the relationship of Pacific Coast figurines to those from the Southwest. In an earlier paper (Heizer and Pendergast 1955) it was suggested that the occurrence of fired clay figurines in California may be attributed to influence from the Southwest. While Heizer (1946) and others have demonstrated certain cultural affinities between the Southwest and southern California, and similarities exist between San Diego County and Southwestern figurines (True 1957), some difficulties arise in considering occurrences in northern California in terms of indirect Southwestern influence, since evidence of cultural interchange between southern and northern California is lacking. This spatial separation, as well as differences in form and decoration, combines with a rather considerable disparity in age to suggest that the northern California specimens might more properly be viewed as an independant development.

The Washington occurrence suggests even more strongly that the northern Pacific Coast figurines represent an independent development, since spatial and cultural separation precludes the possibility of influence from the Southwest. The basic continuity of the culture pattern in northern California and the Northwest Coast, as well as the relative isolation of this culture area, suggest that the Washington and northern California figurines are manifestations of an impetus which arose within the

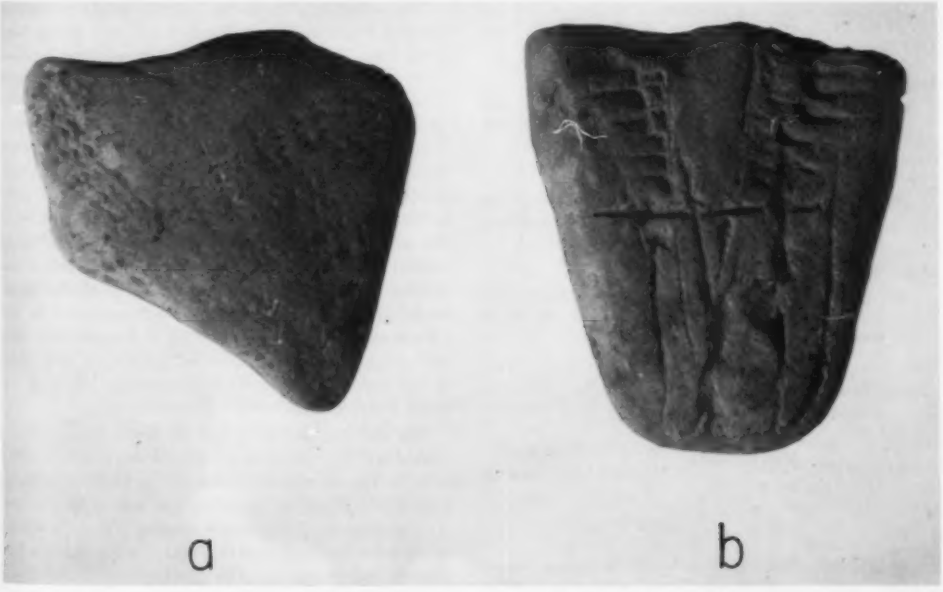

FIG. 1 [Pendergast]. Figurine fragments from the vicinity of Sara, Washington. Length of *a*, 22 mm.; length of *b*, 25 mm.

generalized Northwest Coast culture pattern independent of influence from outside sources.* If this premise is accepted, one can argue convincingly for independent development of the fired clay figurine complex in Central California as well.

Although fired clay figurines are in general associated with agricultural complexes in the Southwest, Meighan (1953) has demonstrated that the production of figurines is not necessarily dependent upon an agricultural economy, suggesting use of figurines as dolls. Barrett (1952), on the other hand, notes use of figurines as physical representations of children desired by women among the Pomo. While at the present level of knowledge the question of the functional significance of human figurines cannot be resolved, it is notable that neither of the above suggested functions precludes the possibility of independent development of this trait within a given group. It therefore seems more profitable, in the light of present data, to undertake analysis of fired clay human figurines on the Pacific Coast in terms of immediate cultural associations rather than extended spatial relationships.

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DAVID M. PENDERGAST
University of California
Los Angeles, Calif.
February, 1957

* EDITOR'S NOTE: While the present article was in press, Douglas Osborne's "Pottery in the Northwest" was published in AMERICAN ANTIQUITY (Vol. 23, No. 1, pp. 28-34), commenting on this same general topic.

A SUSQUEHANNOCK LONGHOUSE

During the summer of 1956 an excavation was conducted by the Lower Susquehanna Chapter of the Society for Pennsylvania Archaeology in cooperation with the Pennsylvania State Museum. The work was done on the Oscar Leibhart farm, 6 miles south of Wrightsville, Pennsylvania, at Long Level, on a hill top overlooking the Susquehanna River. From a preliminary study of the trade goods recovered from this excavation, and an analysis of the grave materials previously uncovered by the Leibharts, it is evident that this is the site of a Susquehannock village of about 1650 to 1675.

Our original intention was to locate an alleged palisade ring, but what we actually found was the plan of an aboriginal longhouse. A test trench was begun near what was thought to be the center of the site. After a distinctive series of postmolds was discovered by George Boyd, a member of the local chapter, the trenching was halted. An area consisting of 38 10-foot squares and one 5-foot square was laid out and dug by squares. Each postmold was split and cleaned out, depth and diameter measurements were taken, and profile drawings were made. Although this splitting of each was time consuming and laborious, we secured thereby the advantage of distinguishing various types of postmolds. This technique also produced a sampling of wampum-shaped beads, made by the cane method, which have their greatest frequency from 1640 to 1660 (Wray and Schoff 1953), also a brass arrowpoint, a possibly identifiable wood fragment, and other data that will be helpful in the interpretation of this site.

The postmold pattern uncovered indicates a Susquehannock longhouse measuring approximately 92 feet long by 24 feet wide. The average sized post was 2 to 3 inches in diameter, pointed, and was driven into the ground. This was particularly apparent along the sides of the house. In the center of the house there are a number of blunted and large postmolds, 4 to 6 inches in diameter. Some of these posts were probably placed under the roof in order to brace a sagging section. There are 7 postmolds, outside of the house wall, that are inclined toward the sides of the longhouse, which once held slanting support props. This type of postmold is indicated in the drawing by a broken line around the end of the mold. Evidently the entrances to the longhouse were at the corners and at 2 gaps, on either side of the structure, near the center. The paired postmold pattern on both sides of the interior walls of the longhouse may relate to the bedding arrangements of the Susquehannocks.

The broken oval lines within the house plan represent stained and burnt areas in the subsoil that probably relate to an earlier occupation of the site by Clemson's Island and Middle Woodland peoples. The lack of Susquehannock artifacts and the presence of a few Clemson's Island and nondescript cord-marked pottery sherds in these pits supports this suggestion. The absence of definite fire pits with Susquehannock artifacts indicates that the inhabitants merely scooped out a small amount of top soil

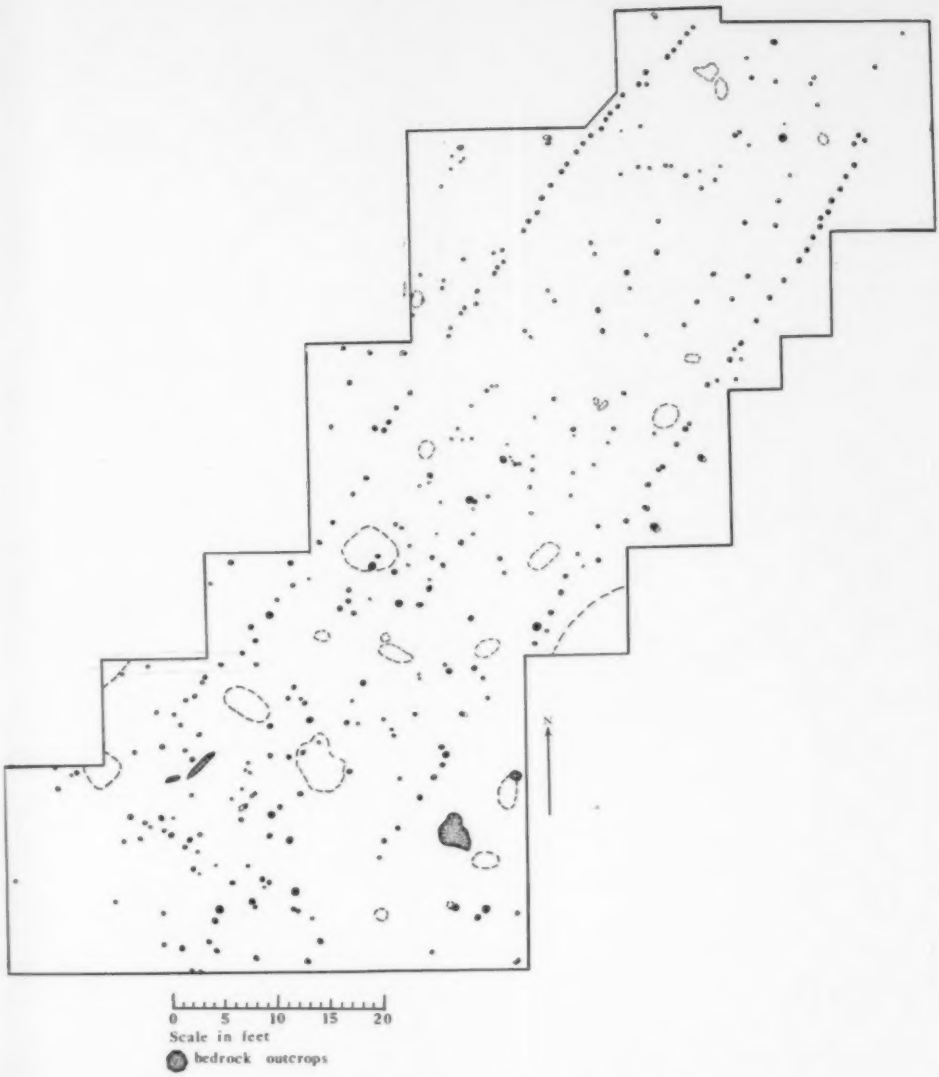

Fig 1 [Kinsey]. Floor plan of Susquehannock longhouse at the Oscar Leibhart site, 36Yo9. (Drawn by W. F. Kinsey.)

inside the house for fireplaces. One fire pit, pertaining to the Susquehannock occupation of the site, was found in the trench, a few feet to the west of the longhouse.

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1953 A Preliminary Report on the Seneca Sequence in Western New York, 1550-1687. *Pennsylvania Archaeologist*, Vol. 23, No. 2, pp. 53-63. Milton.

W. Fred Kinsey
Pennsylvania State Museum
Harrisburg, Pa.
November, 1956

SPECIFICATION SURVEY FOR RADIOCARBON DATING*

In the summer of 1955, Nuclear Science and Engineering Corporation, as a basis for determining the demand and desired specifications for radiocarbon dating, carried out a survey of people and institutions believed to have some interest or potential interest in such dating. Polled were archaeologists and geologists in universities, museums, and oil companies. A total of 223 questionnaires was sent to these scientists, requesting information about their interest in having available a commercial laboratory for radiocarbon dating and the specifications that they would require in the analysis of the samples that were available.

Of the 223 questionnaires that were sent, 82 replies (37%) were returned. Of these 82 replies, 58 (71%) indicated that the correspondent was interested in having available a commercial laboratory for radiocarbon dating, 13 (16%) indicated that they already had a service available for having their samples dated, and 11 (13%) indicated no interest.

The information that was requested in the questionnaire included the following: (1) The type of sample that was available or of interest. Listed were charcoal, shell, bone, wood, antler, lake mud, marine sedimentation, and other; (2) The desired dating limit. Listed were 30,000, 35,000, 40,000, 45,000, 50,000, 55,000, and >55,000 years; (3) The desired precision for recent ages (<5000 years). Listed were 200, 100, 50, 25, and 15 years; (4) The sample size that was available. Listed were <1, 1-5, 5-10, and >10 grams. Tables 1 through 4 summarize the answers given in the 58 replies that were returned with this information.

TABLE 1. TYPE OF SAMPLE AVAILABLE OR OF INTEREST.

Type of Sample	*No. of replies indicating interest*
Charcoal	38
Shell	38
Bone	33
Wood	32
Antler	14
Lake Mud	8
Marine Sedimentation	7
Other (e.g. peat, vegetation, etc.)	15

TABLE 2. DESIRED DATING LIMIT (4 SIGMA CRITERION).‡

Age (years)	*No. of replies*
30,000	29
35,000	0
40,000	4
45,000	0
50,000	0
55,000	4
>55,000	5

‡ 4 sigma criterion now being generally abandoned; limit is increased by 5000 years with 2 sigma criterion.

TABLE 3. DESIRED PRECISION FOR RECENT AGES (<5000 YEARS).

Standard deviation (± sigma) in years	*No. of replies desiring stated precision*
200	14
100	18
50	10
25	3
15	4

TABLE 4. SAMPLE SIZE USUALLY AVAILABLE.

Size (grams)	*No. of replies*
<1	4
1-5	12
5-10	14
>10	14

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December, 1956

FATHER ACOSTA ON THE FIRST PEOPLING OF THE NEW WORLD

In the April, 1956, issue of AMERICAN ANTIQUITY (Vol. 21, No. 4, pp. 420-1) Ronald L. Ives discusses the possible beginnings of the theory of the Asiatic origins of the American Indian. In this connection he cites the recent translation of the *Description of the Province of Sonora* by Father Ignaz Pfefferkorn, S. J., published originally in German in 1794-95.

More than 200 years earlier, Father José de Acosta, S. J., in his *História Natural y Moral de las Indias*, first published in Seville in 1590, considers all the various current theories about the origin of the American Indian, in Book 1, Chapters 16-25. He disposes of Aristotle, Plato, and other classical authors with unusual sharpness for the time he wrote, concluding that Plato's description of Atlantis was either fantasy or allegory. Although the lost continent of Mu had not yet been invented, he deals summarily with its antecedent, the "Euphrates" of Esdras in the Apocrypha, saying he cannot see that ". . . it gives any better passage for man to the New World than did the enchanted and fabulous Atlantis of Plato." The same discussion disposes of the "Lost Tribes of Israel" theory.

"Certainly it is not to be thought that there was some other Noah's ark in which men were brought to the Indies and even less than that some angel brought the first residents of this [new] world, hung from their hair like the prophet Abacuch. Because one does not treat of what God might be able to do, but what is in conformance to reason and to the order and style of human affairs. And thus one must, in truth hold as marvellous and private secrets of God two things: one, how could mankind cross such great immensities of seas and lands; the other, how, having been such innumerable people here, they were hidden from us so many centuries? Because of which I ask, with what thought, with what industry, with what force did the lineage of the Indians pass such a vast sea? Who could have been the inventor

* Presented at the Conference on Radiocarbon Dating at the R. S. Peabody Foundation, Andover, Massachusetts, on October 1, 1956.

and mover of such an extraordinary passage? Truly I have argued with myself and with others on this point many times, and never found an answer which satisfied me. But finally, I will say that which appears to me; and if I lack authorities to follow, let me as I must follow the thread of reason, even though it be delicate, to the point where all disappears from my eyes. One thing is certain, the first Indians came in one of three manners to the land of Peru. Because they came either by sea or by land; and if by sea either by accident or by their own determination; I say by accident, tossed by some great tempest, as happens in contrary and stormy weather; I say by determination, if they sought to navigate and seek out new lands. Outside of these three ways, no others occur to me if we are to talk of the course of human affairs and do not try to fabricate poetic fictions and fables, if one has no lively desire to seek another eagle like that of Ganymede, or some winged horse like that of Perseus, to carry the Indians through the air. Or perhaps it pleases one to provide fish, sirens and *Nicolaos* to transport them by sea?" (Pp. 60-1.)

I have not been able to identify the allusion to Nicolaos; possibly it refers to the Nicolaitan sects, some of which in the Middle Ages rejected outward forms and depended upon special revelations. The translations from Acosta are mine. I have used the edition published by the Fondo de Cultura Economica, Mexico, 1940, edited by Edmundo O'Gorman. O'Gorman's preface is very useful. An English translation of Acosta was published by the Hakluyt Society, Vols. 60 and 61, London, 1880.

Fr. Acosta next discusses the possibility of planned navigation to the New World, alluding, among other things, to the voyage of Alvarao Medaño to the Solomon Islands, "believed to lie near New Guinea," and the possible relation to the voyagers of Sidon and Tyre in the time of Solomon. Fr. Acosta rejects long distance navigation without the compass saying: "Those who know something of the sea understand well what I say." It may be remarked that, according to Alexander von Humboldt, Fr. Acosta was the true precursor of the study of magnetic variation and had studied navigation with the Portuguese. Acosta also cites 2 famous pilots of his day.

Fr. Acosta concedes that it is quite probable that the Americas might have been reached by accident by ships caught in a storm, referring to his own voyage which raised landfall 15 days after leaving the Canaries. Yet he finds difficulties with this as an adequate explanation. Scriptures require him to postulate an origin in Europe or Asia not only for the American Indian, but for the many animals. He doubts that humans traveling by sea would have brought with them lions, tigers, foxes, and similar animals and it taxes his credulity that this should have occurred precisely with the rare vessels cast on American shores by accident. Further, he points out that many of these animals are absent from the Islands of the Caribbean. Man, too, was absent from such islands as the Bermudas and was found only on islands reachable by small craft without navigation aids. Relevant to some current propositions, he records the astonishment, incredulity, and even fear of the Peruvians of Tumbes when they saw the first small ships of the Spanish.

In Fr. Acosta's time the southern extension of Tierra del Fuego was not yet known; neither was the coast of California above Cape Mendecino. Yet he points out that the trends of both the east and west coasts of North America suggest that in unexplored northerly latitudes they might approach Europe and Asia very closely, and actual land bridges might exist in either case as well as in the unexplored south.

Without reviewing his argument in detail he concludes that although shipwrecks cannot be ruled out, the bulk of the American Indians arrived overland, with perhaps short stretches of navigation. He postulates small groups of savage hunters, either in search of new lands or crowded out of their old homes, migrating slowly until they had occupied the continent. Subsequently, in a few places, men of ability were responsible for the gradual growth of the barbarous kingdoms of Mexico and Peru.

So far as I know not for about a century and a half did any writer come as close to modern views about the origin of the American Indian.

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Los Angeles, Calif.
February, 1957

A PUNCHED CARD SYSTEM FOR RADIOCARBON DATES

At the present time there are nearly 1200 radiocarbon dates published from 11 different laboratories. These dates appear in a total of 6 books, monographs, mimeographed lists, and journals. While most of the dates appear in the publication *Science*, it is nonetheless difficult to sort through the various numbers of this journal in order to compile dates for any one time period, area, or topic. Realizing that the dates could not be utilized efficiently under these circumstances, J. B. Griffin of the University of Michigan, Museum of Anthropology, suggested that an expandable file system be devised for all published radiocarbon dates. From the onset of the project it was apparent that a manual-sort, punched card system probably would be the most feasible means of recording the dates. Since 1948 the Museum of Anthropology staff has used punched card systems for archaeological or ethnobotanical information, and I previously adapted a punched card system to handle community study data. J. B. Griffin, V. H. Jones, A. C. Spaulding, and I established a set of categories suitable to the particular problem of radiocarbon dates and developed a system based on these categories. In September of 1956 the proposed system was presented to the Radiocarbon Committee of the University of Michigan, and the Memorial Phoenix Project of the same institution provided the funds necessary to carry out the project.

The details of the system and a reproduction of a key card appear here. These have been published with the hope that they may serve as useful guides to others facing

the problem of handling the ever-growing number of radiocarbon dates appearing in print. It should be pointed out that this system was designed for use by geologists, botanists, oceanographers, and paleontologists as well as by anthropologists.

It was decided that the cards should be keyed to 7 types of information to make one or more types readily accessible. These are the date, the type of sample, the discipline or disciplines for which the date has primary interest, the geographical area from which the dated material was derived, the dating method or methods, and the laboratory processing the date.

The form of card used is type KS-137 B manufactured by the McBee Keysort Company. On each card was typed a complete quotation of the published information accompanying the date. The information was presented in the standard form for dates published in *Science* and elsewhere, that is, with the laboratory number on the left section of the card, the text in the central area, and the B.P. date and standard deviation on the right. Additionally in the upper left corner of each card was typed the geographical area from which the sample originated and at the top center was placed the Christian calendar date; at the end of the quotation the source, including author, date of publication, and page was noted. In some instances the text accompanying the date could not be fitted onto both sides of one card, in which case an abstract was made and so noted on the card. The key sort information appearing on the card was underlined, and the underlining or italic print in the publication was omitted to avoid confusion (see Fig. 2 for a typical entry).

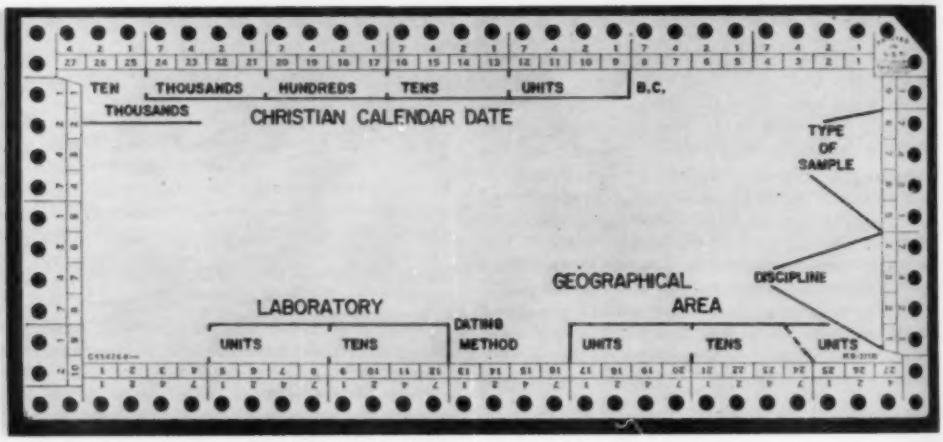

FIG. 1 [Oswalt]. Punched card key for radiocarbon dates.

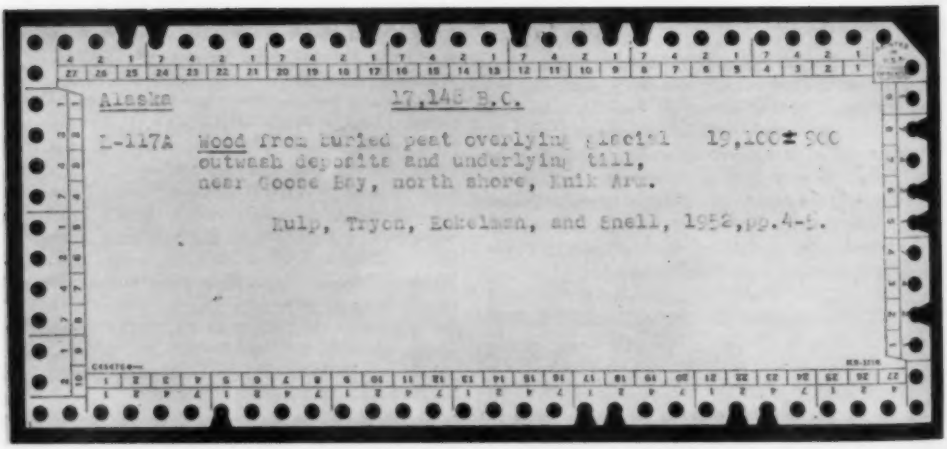
Alaska
17,148 B.C.
L-117A Wood from buried peat overlying glacial outwash deposits and underlying till, near Goose Bay, north shore, Knik Arm.
19,100 ± 900
Rubp, Tryon, Eckelman, and Snell, 1952, pp. 4-5.

FIG. 2 [Oswalt]. Typical punched card for a single radiocarbon date.

In keying the cards (Fig. 1) the Christian date appears along the top left of the card; if the date is B.C., an additional hole to the right is punched. For example, the date 17,148 B.C. would be punched as follows: in the *upper* line of printed numbers on the card the numbers 7 and 1 would be punched for units, 4 for tens, 1 for hundreds, 7 for thousands, and 1 for ten thousands. Additionally the hole keyed to B.C. would be punched. As noted previously, no allowance is made in the sorting system for standard deviation.

The type of sample is keyed on the right side of the card in the upper half to the following categories: 0 (no punch), bone; 1, charcoal; 2, dung; 3, marl; 4, shell (with no further information concerning type); 5, shell (freshwater); 6, shell (saltwater); 7, teeth; 8, tufa; 9, vegetable material; 10, wood; 11, other.

The discipline is keyed on the lower right side: 1, anthropology; 2, geology; 3, oceanography; 4, paleobotany; 5, paleontology and 6, other.

The geographical area from which the sample was obtained is keyed to the units space on the bottom right of the card. In this primary key 0 is North America; 1, Central America; 2, South America; 3, Europe; 4, Africa; 5, Oceania; 6, Asia; and 7, Oceans and Seas. The tens and units adjacent to the primary geographical area key are secondarily keyed to country, state, province, territory, island or island group, ocean or sea. For example, since North America is primary key 0 and Alaska is secondary key 63, an entry for Alaska would be 0, 63.

The dating method is keyed on the bottom center of the card as follows: 0, acetylene proportional counter; 1, CO^2 Geiger counter; 2, CO^2 proportional counter; 3, methane proportional counter; 4, scintillation counter; 5, solid carbon counter; and 6, other.

The laboratory processing the date is keyed on the bottom left center to a list of the 22 laboratories known to have radiocarbon dating devices even though not all of them have issued dates.

From the appearance of the sample key card (Fig. 1) it is apparent that all the categories can be expanded in the space allotted except the one for primary geographical area. Also, the left side of the punched card has not been used but can be keyed later to pertinent categories not recognized at this time, or to special problem sorting.

An ordinary card filing system is expandable and flexible but cannot be keyed conveniently to more than one subject, whereas a punched card system is much more versatile. With a few simple operations all the punched cards can be sorted for a single time period, geographical area, or for any one or combination of the other subject headings.

An exact record of the hours required to type the punched cards, derive Christian dates, check the entries, and punch the cards has not been kept, but it is estimated that approximately 12 to 14 hours are needed to process 100 cards.

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February, 1957

COMMENT ON "METHOD AND THEORY IN AMERICAN ARCHEOLOGY"

In the July number of this journal Albert C. Spaulding delivered himself of a most penetrating review of the first of the authors' 2 *Anthropologist* papers on method and theory in American archaeology. This note is in no sense a reply to his review but it seems to us that additional information about our paper and its subsequent history might prevent misunderstanding. Shortly after its publication in December, 1953, we received a long letter from Spaulding in which this paper and its authors were subjected to similar but even stronger criticism than in the review under discussion. We suggested then that the prosy subject of archaeological theory might be considerably enlivened by publication of this letter, but at the time Spaulding seemed disinclined to do so. In any case, mainly as a result of this letter and later verbal exchanges with Spaulding, we rewrote and expanded the paper and it is now being published by the University of Chicago Press as part of a volume which will have appeared by the time this note is printed. It seems proper to call attention to the fact that passages singled out by Spaulding for special criticism in both letter and review have been extensively modified in the revised version. Spaulding has seen this revision and expressed himself as being, not satisfied, to be sure, but pleased to find in it some accommodation to his ideas. In view of these facts, we would like to suggest that any further discussion of this paper, critical or otherwise, be based upon its present version rather than that of 1953.

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August, 1957

training in the archaeology of the Southwest dates back to a time when North American archaeology was strictly compartmentalized.

Together these 4 seminars demonstrate a growing together, rather than a falling apart, of archaeology and the other special disciplines of anthropology. They constitute evidence of that characteristic flair of anthropologists for jumping the gates of specialism in the cause of understanding human development.

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Archaeology and Its Problems. SIGFRIED J. DE LAET. Translated from the French by Ruth Daniel. Macmillan, New York, 1957. 136 pp., frontis., 3 figs., 20 pls. $4.50.

This little book points up the great difference in basic viewpoint that exists between most American and most Old World archaeologists. But even allowing for this difference, I cannot recommend the book to any audience, for it is intellectually naïve, technically most inadequate, almost invariably superficial in its treatment of important topics, and deliberately provincial in scope.

As so many books do these days, this one is addressed "primarily to the general public" (p. 122), which is all the more reason it should state more adequately the real scope of archaeology's interests and the truly complex problems with which it treats. However, the give-away is found in the preface, where the author states that he originally wrote the book for his own benefit, "to clarify his thoughts upon certain problems of methodology which had been preoccupying him for a long time."

I hate to deal so harshly with a Belgian who stoutly defends the American excavations at Hissarlik against a French critic who regretted the increasing encroachment of technique upon thought (p. 82). But except in the richness of its illustrative data, this book falls short of doing justice to even limited objectives. We surely have no argument with most of De Laet's admonitions: his disapproval of collecting as an end in itself, and of commercialism and falsifying, his pleas for the proper preservation of specimens and full publication of results. But here are examples of the help he offers beginners: 4 pages devoted to stratigraphic analysis (these are small pages, not double column), 2 pages to "publication of excavation reports," 3 pages to preservation of archaeological evidence (no preservatives are mentioned specifically), 2 pages to "the reconstruction of social organization from archaeological remains." In the one page on surface collecting, there is no mention either of the problems involved or of the ingenious techniques of method and interpretation devised by Americanists in recent years.

In this connection, I cannot help but feel that the book would be much more useful if De Laet had not limited himself to prehistoric and provincial Roman archaeology for his examples. He violates his own rules occasionally, to quote such eminent Old World authorities as Childe and Grahame Clark, but he completely ignores the considerable body of archaeological theory that has concerned Americanists for many years: such concepts as the area cotradition, cultural stability and the dynamics of tradition, settlement patterns, prehistoric acculturation, and culture contact situations. De Laet leaves no doubt that he considers archaeology a specialized branch of history (pp. 77, 93, 122, and so on), and although he gives some very brief attention to "culture," he does not really seem to be interested in its nature or its workings. Although he warns that a culture is not founded on one trait or group of traits, he frequently speaks of "the spiral-meander culture" or (p. 60) "the civilization known as spiral-meander ware." His only other concern with culture per se seems to be that of warning against identifying a cultural area with a given race, language, or ethnic group (p. 84). Anthropology is used throughout in its Old World meaning of "physical anthropology."

Actually, De Laet's chief crusade is to free archaeology from the traditional bounds that appear to hold it, in Belgium at least, to the realm of art history. It will probably be difficult for most American archaeologists to realize that this battle is still being fought in Europe. Bearing this in mind, one can perhaps become more sympathetic with De Laet and what he is up against over there. But why should a U.S. publisher fail to consult American archaeologists before bringing out an edition of this book in this country? AMERICAN ANTIQUITY has reviewed several of these largely worthless little books in recent issues. Yet it is next to impossible to get a commercial U.S. publisher to bring out a book by an Americanist; I have in mind a well-written, entertaining, and authentic book with wide appeal, written by a world's authority, and recently published by a University press after it had been peddled unsuccessfully to every major commercial firm. As long as U.S. publishers continue to draw on European and amateur American writers of limited vision, narrow interests, and outmoded technical experience for our "popular" books on archaeology, the American public will find it difficult to learn what archaeology is really all about these days, and American archaeology will continue to be one of the few scientific disciplines in which untrained hobbyists feel themselves fully qualified to work. I cannot imagine any boy reading De Laet's *Archaeology and its Problems* and feeling that he was not already capable of expert excavation and interpretation. Nor do I feel it unfair to venture the opinion that almost any serious graduate student of American archaeology, with one summer of field experience, could have written a more thoughtful, a more technically sound, and a more helpful book than this.

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Piecing Together the Past. The Interpretation of Archaeological Data. V. GORDON CHILDE. Frederick A. Praeger, New York, 1956. vii+176 pp., 4 figs. $3.95.

Although many books have appeared recently on field methods, this is one of the first devoted solely to archaeological interpretation as such. It is a book with a popular title, which is, however, meaningful primarily to the specialist. It might have been subtitled "An Essay on the Archaeological Taxonomy of Europe and the Near East" for it lacks any reference to theoretical contributions to interpretation by archaeologists of the New World. Such an omission in a volume devoted to outlining "methods of extracting history from archaeological data" seems indeed unfortunate.

The book provides a brief background sketch of archaeological interpretation and then deals with "functional" (that is, typological), chronological, and "chorological" (geographic distribution) aspects of classification and interpretation. The final chapter provides Childe's views on the general contributions of archaeology as a field of study.

The discussion of taxonomy is a difficult one, involving as it must both diachronic sequence and synchronic description. (The nature of such a classification has been a major concern to zoologists and the reader is referred to Simpson in his *Classification of Mammals*, and to Le Gros Clark's *Fossil Evidence*, for many pertinent remarks.) Unfortunately in the discussion of this topic Childe has introduced an element of confusion which tends to vitiate the clarity of exposition; namely, the use of 3 different definitions for the term "culture." First, he uses an archaeological definition which is objective and synchronic in nature, being defined as an *assemblage* of types associated because they were made by the same people. Several such assemblages ("cultures") may co-exist and are identified by diagnostic artifact *types*. The nature of the classification of these (dealt with in detail by J. O. Brew in his *Alkali Ridge*) is summarized by Childe in terms of 3 criteria: (1) capable of *ostensive* definition (formal features reproducible diagrammatically); (2) exclusive association with similarly defined types; (3) distribution in a recognizable pattern.

The second definition used, but not explicitly differentiated from the first, is "culture" in the full anthropological sense of the word, for which we might use the phrase "social tradition" as opposed to assemblage. While this definition includes the assemblage as the manifestation of its material expression, the social tradition is diachronic in nature, and may exist through several archaeological "periods" (thus including several assemblages, since Childe defines a "period" as "just that period of time during which a particular set of types were current in a certain province"). But he also states that "the practice of applying one and the same name to a period and to a culture has been responsible for horrible confusion. . . ." Clearly a distinction must be made between an objective assemblage used as a period indicator, and a "culture" which is an interpretative pattern that may involve several periods and several assemblages (both directly derived and colaterally divergent). Childe reviews some of the systems of nomenclature now in use pointing out various shortcomings (usually arising from a failure to distinguish the need for both a concrete archaeological relative chronology, and a parallel system of functional interpretation). Childe's logical mind would like a logical system which would incorporate all these needs and be world-wide in application. In view of past experience his arguments on this subject are less than convincing. The third definition appears in those few cases where he uses the word "culture" in a general, cumulative sense on a world-wide basis.

Childe points out that 19th century scholars made up logical diachronic series from synchronic ethnological data, and that archaeology alone was able to give factual diachronic data to test these logical constructs. He is, himself, perhaps engaged in the reverse process of using diachronic archaeological data to set up synchronic patterns which are logical enough, but remain to be tested against observable synchronic facts. What is needed is a series of studies challenging and exploring many of the interesting postulates based on archaeological discoveries. There are a number of questions that might be asked. What does "social surplus" mean operationally in different societies? What would actual time studies of people's activities show from one society to another in terms of the "leisure time-ingenuity" problem? What are the distribution patterns of known material cultures actually like, and how do they reflect the social traditions they represent? What changes in material culture can be shown from historically known instances of such situations as conquest, colonization, migration, or expansion? What are the various types of trade carried on between people, and how and what kind of ideas are exchanged in each case (Childe suggests "silent trade" as a possibility in the Stone Age for example)? What objects are unique in various cultures and what is their importance to the society? These and many other questions require exploration.

Childe's book, in spite of its difficult writing, contains many provocative ideas and much sound advice. It also illustrates very clearly that social anthropologists (as well as archaeologists in different parts of the world) must challenge archaeologically derived assumptions about culture at every turn, and must test them rigorously against the web of evidence. By this process both fields of study will be greatly enriched through the asking of new questions and the finding of new answers.

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Cultural Chronology and Change as Reflected in the Ceramics of the Virú Valley, Peru. DONALD COLLIER. Fieldiana: Anthropology, Vol. 43, Chicago Natural History Museum, Chicago, 1955. 226 pp., frontis., 72 figs., 12 tables. $6.00.

This volume is another in the series of publications resulting from the cooperative program of the Virú

Valley Project, sponsored by the Institute of Andean Research. A detailed account of the project and its results appeared in *Memoirs of the Society for American Archaeology*, Number 4.

Each of the participating instiutions, and the members thereof, undertook different phases of a coordinated program designed to reconstruct the culture history of a small north-coastal Peruvian valley from the time of its "earliest human occupation to the present." The first objective was a relative chronology by which to date those events and changes that might be uncovered by the investigations. It was hoped that such a chronology might be determined by stratigraphic analysis of ceramics from refuse deposits combined with dating by means of surface collections from a large number of sites.

Collier undertook stratigraphic excavations in refuse deposits of the Late Epoch. Later, when it became apparent that there was a "temporal and developmental gap" between the early material and that which had been recovered by Collier, he successfully undertook further excavations in a refuse mound which surface survey indicated might fill the gap,

This report deals with the results of these excavations. Collier dwells briefly on the organization and purposes of the Virú Valley Project, the archaeological background of the area concerned, field techniques utilized, and general problems he hoped to solve. The majority of the report, however, is devoted to description and discussion of the sites excavated, such architectural features as were found, and, as the title indicates, an analysis of the ceramics recovered from the excavations, including grave pottery. A concluding chapter ties this material together and places it all in the broader outlines of Peruvian coastal prehistory.

In addition, there are 5 appendices, dealing with sherd percentage distributions from the test excavations, a lengthy and detailed description of pottery types used in the ceramic analysis, 2 very brief analyses of plant and animal remains, and a brief analysis of grave pottery uncovered by Willey (but unclassified by him) from a nearby Tomaval site. The report is well illustrated with excellent photographs (especially of the pottery), charts, maps, cross-sectional drawings, and rim profiles. One comment should be made regarding the photographs of both the pottery sherds and the whole vessels — in none of them is there any scale indicated. Though generally (but not always) dimensions are given for these figures in the text, it is not easy for one unaccustomed to the general size range of Peruvian pottery to envision just how big or small they may be. Further, comparisons indicate that the vessels shown in any one plate are not reproduced to the same scale.

In a very interesting section of the chapter "Ceramic Analysis" Collier discusses at some length moldmade pottery and molding techniques employed on the north coast of Peru, especially in the Late Epoch. The difficulty of determining molding techniques from sherds alone without the benefit of having complete, or nearly complete vessels, at hand, is clearly demonstrated. This section would have been vastly helped by a few drawings or representational figures exemplifying the molding techniques discussed. The molding of pottery on the north coast of Peru was evidently a long tradition, especially for grave vessels. Plain domestic pottery was not moldmade until Tomaval times.

This report will be largely of use to the specialist in the Peruvian field, especially when used in conjunction with the other reports of the Virú Valley Project which have already appeared in print (a list of these is given in the preface of this report). There is, however, much which will interest the more general archaeologist. The brief synopsis in the introduction on the archaeological background of the material presented is a clear, concise summary of the situation, placing the material discussed in its proper and broader context. As mentioned above, the section on molding techniques should interest ceramic students at large. Comparative studies with other areas, such as Mesoamerica, might be most productive.

The final chapter, "Conclusions," is not only an excellent summary, but it also demonstrates some of the cultural changes which took place in the Virú valley. Population shifts are dealt with, as are the possible impacts upon socio-religious customs brought about by new techniques such as irrigation or by militaristic conquest. Interestingly enough, through these changes, there is a strong continuity of domestic pottery in the Virú valley, showing that the basic population group remained the same for a long period of time, though it may have shifted from spot to spot within the valley itself.

This report, and the companion volumes either already issued or to be issued, should be standard reference works for all archaeologists seriously interested in the current theories, techniques, and methods relating to anthropological studies of an area nature.

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Medieval American Art, Masterpieces of the New World Before Columbus. PÁL KELEMEN. Revised one-volume edition. Macmillan, New York, 1956. xxii + 414 + 33 pp., 308 pls. $15.

The rising cost of printing is creating serious problems in the publication of books about art, especially those intended for wide circulation. Improved and mechanized methods offset to some extent the cost of ordinary publications, but they are inapplicable to reproduction of such quality as is required to present works of art. Good illustrations are extremely costly, and indifferent illustrations can destroy the value of a subject as completely as would the substitution of an inferior copy for the original. It is, therefore, a noteworthy achievement that the publishers of Kelemen's work have succeeded in cutting its price to about half the list price of the latest 2-volume edition, and have done so without any essential sacrifice of quality. Nothing of value has been omitted, and the illustrations remain as excellent as in the original work. The book is printed on thinner paper, and title sheets between

groups of plates have been dropped; otherwise, the format, the plate arrangements, and the text remain exactly the same.

It is not necessary to review the nature of the book itself, for it is well known as the best compendium of the art of Nuclear America now in existence, or that we are likely to have for some time. Its illustrations, numbering well over 900 photographs, include examples of ancient art from all the areas of high sedentary culture in the Americas with the exception of the Pacific Northwest. They cover architecture and sculpture, painting, woodcarving, the lapidary arts, ceramics, textiles, metal work, and various minor crafts. The excellence of the selections and their presentation make the book an outstanding summary of the best that pre-Columbian art in America has produced. For its scope, the original publication was modestly conceived, and struck a nice balance between quality and economy. It was reprinted twice in its original form before it became necessary to make further revisions if it was to reach the libraries of students and the interested public.

The changes in plates and text are minor, and the additions more than outweigh the enforced economies in paper and binding. Several pictures of Peruvian architecture have been replaced by newer and better photographs, and 2 new plates have been added, with a discussion which has been placed in the preface to the new edition rather than interpolated in the body of the text. The 7 new illustrations were chosen with Kelemen's unerring taste for the best in any given style. A huge Olmec head from San Lorenzo helps to fill in a serious gap in the original presentation of sculpture, and a portion of the mural from Bonampak, Chiapas, does the same for painting. Both were discovered since the book was first published. Unfortunately, Kelemen makes an error in assigning to Antonio Tejeda the copy of the Bonampak mural which he has used for his illustration, and in giving credit to the Carnegie Institution of Washington and to the Peabody Museum of Harvard for its reproduction. The copy is that of Augustín Villagra Caleti, and is presently in the National Museum of Mexico. Perhaps it speaks well for the accuracy of both copyists that such a mistake could happen, in spite of the care and appreciation that is evident in all of Kelemen's work. Nevertheless, even a minor flaw is to be regretted in a book otherwise remarkably free of such oversights.

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La Cuenca de México. Consideraciones Geológicas y Arqueológicas. FEDERICO MOOSER, SIDNEY E. WHITE, AND JOSÉ L. LORENZO. Instituto Nacional de Antropología e Historia, Dirección de Prehistoria, Mexico, 1956. 51 pp., 12 figs., 3 tables.

This is an up-to-date summary of the complex problems of Pleistocene and Recent stratigraphy in the Valley of Mexico. The published works of Arellano, de Terra, Bryan, and others since 1946 are relied upon for certain aspects of this study. Some of their interpretations have been modified; some new studies and the recent pollen analyses of Sears and Clisby are brought in; and radiocarbon dates are utilized as reference points in the uppermost deposits. It is assumed that glacial advances and retreats on the great volcanos are local reflections of worldwide climatic changes, first because the "final" Pleistocene glaciations in Europe and America are shown by radiocarbon datings to have ended about 7000 years ago, and second because the Altithermal period of warmth and desiccation has also (they say) been shown to have endured on both continents from about 7000 to 4500 years ago. No proof is offered that radiocarbon dates have determined such an age and duration for the Altithermal period on either continent, however likely this estimate may be.

The publication is in 3 parts: Geological Considerations on the Formation of Lake Texcoco (Mooser); Glacial Geology of Iztaccihuatl (White); and Notes on Archaeology and Climatic Changes in the Valley of Mexico (Lorenzo).

Mooser reviews the difficult problem of determining the geological age of all deposits in the Lake Texcoco basin except the latest ones. No one doubts that the Noche Buena formation (with associated archaeological remains, including ceramics), the Totolzingo "earth," and the underlying Barrilaco Caliche, totaling a few meters in thickness, are "Recent" or post-Wisconsin in time. Beneath them, the Upper Becerra formation, in the top of which mammoths and associated artifacts have recently been found, and to which the Tepexpan skeleton is believed to belong, is certainly the last deposition in this basin which can be correlated with the final Wisconsin glaciations. Beyond this, agreements end. Bryan correlated *both* the Upper and the Lower Becerra with only the *last* Wisconsin phases ("Cochrane" and "Mankato"); de Terra correlated Upper and Lower Becerra with Upper and Lower Wisconsin; and Arellano correlated Upper Becerra with the whole Wisconsin, Lower Becerra with another glacial period: Illinoian (Table I). Between the Upper and Lower Becerra, the "interformational caliche" has been interpreted by these authors either as an interstadial or as an interglacial phenomenon. Underlying the Lower Becerra, the Morales Caliche was considered an interstadial midway in the Wisconsin by Bryan, as an interstadial early in the Wisconsin by de Terra, and as an interglacial between Kansas and Illinoian by Arellano. Preceding this, the thick Tacubaya formation, representing a humid climate and rather rich Pleistocene fauna, was interpreted as Lower Wisconsin (Tazewell-Cary) by Bryan, as Iowan (first Wisconsin advance) by de Terra, and as covering the larger part of the Pleistocene (Kansan and Nebraskan glacials) by Arellano.

The thickest and oldest formation in the Texcoco basin, the Tarango, would range in age anywhere from just preceding Wisconsin times to as early as Pliocene, depending upon which of the above schemes is followed. Such divergent opinions allow anything from about 25,000 years to more than 600,000 years as the time re-

quired for deposition of the whole column underlying Mexico City (no one knows yet the actual dates of the Wisconsin and the entire Pleistocene).

Mooser approaches this problem through vulcanology. The greatest eruptions and tectonic stresses which produced the high lava plateau of central Mexico seem to have occurred in the Upper Pliocene, along a great east-west line that crossed Mexico and extended far into the Pacific. The first volcanic mountains were, in the course of time, greatly modified by erosion and a "primitive" Valley of Mexico then drained toward the Pacific. This long cycle of erosion produced many alluvial "cones" which are now seen as conglomerates on the flanks of the mountains on both the western and eastern sides of the Valley of Mexico and extend downward under the later, lacustrine deposits which now fill the basin. These conglomerates constitute the Tarango formation. Their relation to the later deposits is clearly seen in Figure 7, reproduced from the 1953 publication of Zeevaert.

A new cycle of vulcanism, essentially of massive lava flows, has endured to the present day. This cycle produced a multitude of volcanos and a great barrier between the "primitive" Valley of Mexico and the Río Balsas basin, the Serranía de Ajusco, which now must be crossed by travelers between Mexico City and Cuernavaca. The Valley being closed to outside drainage, lakes began to form in the basin and to be filled with enormous quantities of sands, and ashes from the new volcanos. The pertinent observation is made (p. 17) that, the higher the volcanos and basaltic masses grew, the better became the chances that glaciers could form on them with changes to cooler climate.

The Tacubaya formation of sediments and ashes in the Texcoco basin is correlated by Mooser with evidences of pre-Wisconsin glaciations on Iztaccihuatl. However, he finds it impossible as yet to determine which of the older Pleistocene glaciations were responsible, and states that the Tacubaya formation may even represent "the rest of the Pleistocene" before Wisconsin times. Some lacustrine deposits are found at a depth of 68 m. beneath Mexico City, far down in the Tarango formation. Perhaps they were formed in a small lake behind a "rudimentary" lava barrier during the first cycle of vulcanism. However, the *continuous* deposition of silts, sands, and ashes in the present Texcoco basin began with the Tacubaya formation about 32 m. below the surface deposits.

This matter is outlined here in some detail because of its bearing on a matter of interest to anthropologists in general — namely, the startling announcement in 1954 that Sears and Clisby had found fossil pollen, including *maize* pollen, in borings that reached a depth of 60 m. in the center of Mexico City. Following one geological chronology would give an age no greater than early Wisconsin at this depth; following another and much more likely chronology would place this pollen far back into the Pleistocene or even the Upper Pliocene! Mooser holds that "it is difficult to believe" that the closing-off of the Valley of Mexico by the Serranía de Ajusco occurred no more than 25,000 years ago, a figure which is being quoted widely nowadays for the "beginning" of the Wisconsin glaciation.

In his section, White states that in 1949-1950 he found evidence for 5 substages of the Wisconsin on the slopes of Popocatepetl, at altitudes of 3560 to 4150 m. The streams from Popo, however, flow into the Balsas basin, so their sediments cannot be recognized in the Texcoco chronology. On Iztaccihuatl he found evidence for 3 Wisconsin substages at lower altitudes than on Popo: 3100 to 3500 m. An additional note on the *errata* slip states that in 1956 White found a series of older, pre-Wisconsin glacial deposits (mostly eroded till) at altitudes of 2750 to 3050 m., as well as "remnants of much older glacial till and outwash" at the base of Iztaccihuatl at altitudes of 2430 to 2500 m. Thus, both Izta and Popo, representing the second great cycle of vulcanism, have not only been in existence for a very long time, but they have a glacial history which extends back to one or more of the pre-Wisconsin glacial periods. If the Tacubaya formation, then, is to be correlated with glacial phases in general, for most of the Pleistocene epoch, there is even more reason to consider the Tarango as Pliocene.

Lorenzo summarizes a great many data on the geological history of Lake Texcoco, together with caliche formations, fluctuating climates, soils, archaeological cultures, and radiocarbon dates. Much of this will be familiar to archaeologists who have been keeping up with recent discoveries in Mexico, including the "Early Man" field, as published in both Spanish and English. Of special interest is Lorenzo's map on page 38, which locates key archaeological sites in different periods with reference to the fluctuating levels of Lake Texcoco. This problem was first seen by Vaillant in the early 1930's, but new stratigraphic studies, the "Early Man" problem, pollen profiles, and radiocarbon datings have necessitated many revisions. The results are too complex to be outlined here; it must suffice to say that this chapter, like the first two, is solidly done and must be read by all archaeologists who hope to keep up with the splendid work being done in Mexico.

A very important problem is suggested in Figures 2 and 3, but is not discussed by any of the authors. This is the designation of a major glaciation between Illinoian and Wisconsin with the symbol "X." There are a number of reasons for suspecting that there were 5 rather than 4 major glaciations during the Pleistocene; and if so, recent radiocarbon datings of 25,000 years or so for the "Wisconsin" glaciation do not apply to the *whole* Wisconsin, but only to approximately its latter half. Its earlier half or glaciation "X" is yet to be dated. The interval between them then attains the status of an interglacial period rather than an interstadial within the Wisconsin.

In summary, this publication, while too short to do full justice to the many problems discussed, is an eminently useful compilation of current ideas, soundly treated and without bias.

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Las Culturas Preclásicas de la Cuenca de México. ROMÁN PIÑA CHÁN. Fondo de Cultura Económica, Mexico, 1955. 115 pp., 24 figs., 45 pls., 5 maps.

In this very attractive little book Piña Chán describes Preclassic culture in the Valley of Mexico, drawing heavily on the wealth of material excavated in 1948 at Tlatilco. In an opening note the author states that his intention is merely to present Preclassic data from the Valley of Mexico and that he is not attempting to include all of Mesoamerica or even present day Mexico.

The book consists of 3 chapters. In the first he gives a summary of the latest finds dealing with prehistory or early man in Mexico. This is especially useful because excavations are usually far ahead of publication and here at least is a listing of all the Pleistocene fossils, lithic industries, anad human remains to date. This earliest period Piña Chán dates from 20,000 to 12,000 B.C. To the following period, 12,000 to 8000 B.C., belong the Tepexpan industries. The Chalco complex is dated from 6000 to 3000 B.C., during which time hunting was secondary to gathering and sedentary life was initiated. The years 3000 to 1500 B.C. embrace some sort of primitive or archaic period when agriculture became firmly rooted and pottery was invented.

Preclassic cultures date from about 1500 B.C. to around 200 B.C. The author states that within the Preclassic groups of the Valley of Mexico there are 2 well-defined cultures: (1) The Archaic villagers and agriculturists who possessed corn, fertility and death cults, clay figurines, and utilitarian pottery with incised and painted decoration, usually geometric, which continued around the vessel; (2) The semiurban Olmec culture, which was characterized by a feline deity, cemeteries, skill in working hard stone, ritual pottery, head deformation, tooth mutilation, shaved heads, and witch doctors.

The second chapter deals with the topography, drainage system, and vegetation and climatic changes which have taken place in the Valley of Mexico. Since 4000 B.C. the climate has remained about the same as we know it today. Three maps show the fluctuation in Lake Tezcoco and the location of Preclassic and historic sites. Piña Chán uses the terms Lower, Middle, and Upper for Preclassic subdivisions based on Vaillant's Middle Culture classification, supplementing this with new material. *Lower Preclassic*, 1350-900 B.C., includes the sites of El Arbolillo, Tlatilco, and Zacatenco. *Middle Preclassic*, 900-500 B.C., includes these same sites with the additional ones of Atoto, Coatepec, Xaloztoc, Lomas de Becerra, Copilco, Axcapotzalco, and Tetelpan. Estimated population of the Valley now reaches 3000 to 4000. *Late Preclassic*, 500-200 B.C., is marked by a very dense population. Of the numerous sites listed the most important are Ticoman, Zacatenco, Azcapotzalco, Cuicuilco, Cerro del Tepalcate, and Teotihuacán.

The third chapter, which forms the bulk of the book, is a general description of Preclassic culture in terms of technology, economy, social aspects, material culture, dogma, pottery, and geographical relationships. In some instances phase changes are noted, but on the whole the discussion is general. There is great emphasis on the so-called Olmec influence in the Valley of Mexico as manifested at Tlatilco. This is seen in flat-bottomed vessels decorated with feline motifs cut deep or scraped, black pottery with white rim, rocker-stamp decoration, kaolin ware, hematite mirrors, tiger masks, tooth mutilation, head deformation, hollow clay figurines with tiger-like mouth, beads and eye teeth of jade, A-type clay figurines, and small stone yokes. Outside of central Mexico, Piña relates this complex to Monte Albán I in Oaxaca, Lower Tres Zapotes and El Trapiche in Veracruz, El Opeño in Michoacán, Mamóm phase of Uaxactún, Majadas and Arévalo at Kaminaljuyú in Guatemala, Chavín in Peru, and Playa de los Muertos in Honduras.

The closing section, "Geographical Relationships," is actually a 9-point summary of the book. In conclusion Piña states his belief that these Archaic and Olmec people were contemporaneous, but with origins as yet undetermined. The oldest Archaic groups yet known are those of the Valley of Mexico, the oldest Olmec being the manifestations in the State of Morelos. The latter entered the Valley influencing Tlatilco during the Middle Period. Perhaps the focal point of these Archaic Olmecs will be found where the States of Guerrero, Puebla, and Morelos join. From there, migrations may have gone out to Tres Zapotes and Monte Albán, Chalcatzingo, and Tlatilco. On the coast these eventually became the La Venta culture.

I think it is important to remind the reader how heavily the Tlatilco material is emphasized. Although Tlatilco was important during part of the Middle Period, the basic or most characteristic features of the Preclassic period in the Valley were those exposed by Vaillant in his El Arbolillo-Zacatenco-Ticoman classification, in the sense that this tradition continued through later cultures. The emphasis on clay figurines is, I believe, justified, because, although not found uniformly throughout Mesoamerica, they are an outstanding characteristic of the Valley. I consider Tlatilco to be a one-period site (Late Middle Zacatenco); and that the use of textiles dates from Early Zacatenco (see Vaillant 1930, Excavations at Zacatenco, *Amer. Mus. Nat. Hist., Anth. Papers*, Vol. 32, Pt. 1, p. 38) instead of in Piña's Middle Period (p. 53); and that clay-surfaced structures at Tlatilco (Porter 1953, Tlatilco and the Preclassic Cultures of the New World, *Viking Fund Pubs. in Anth.*, No. 23, p. 34) indicate the presence of building prior to the stone-faced structures of the late Preclassic such as Cuicuilco and Teotihuacán.

A note must be added on the beautiful presentation of the volume with its wealth of drawings and photographs. I am sure we owe the drawings to the talented author himself. This is the only book of its kind in Spanish. Used as a supplement to Vaillant's earlier works it will be very helpful.

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Excavations at Chupícuaro, Guanajuato, Mexico. MURIEL NOÉ PORTER. Transactions of the American Philosophical Society, n.s., Vol. 46, Pt. 5, American Philosophical Society, Philadelphia, 1956. Pp. 515-637, 27 figs. $1.75.

The archaeological site of Chupícuaro, Guanajuato, and its wealth of distinctive pottery vessels and clay figurines, has been known for over 30 years. As a result of small scale explorations in 1926-27, the culture was diagnosed as Tarascan, a term then applied loosely to almost all archaeological finds from western Mexico. However, archaeological research in the mid-1940's established that only the late complex from the Lake Patzcuaro area of Michoacan should be called Tarascan. None of the elements diagnostic of Tarascan culture had been found at Chupícuaro, so its Tarascan affiliations were questioned. How, then, should the Chupícuaro remains be classified? They could not be linked with any other known archaeological complex in western Mexico, and seemed to be completely isolated from neighboring archaeological provinces.

The above sequence of events led to the setting up of an excavation program at Chupícuaro by the Instituto Nacional de Antropología e Historia during 1945-47. Muriel Porter reports on the results of those excavations in this monograph.

The Chupícuaro complex is now thought to extend over a considerable area of southern Guanajuato in central Mexico. The greatest concentration of remains seems to be along the Lerma River around the village of Chupícuaro. Excavations, consisting of a number of pits and trenches, were in and adjacent to that village. Digging was concentrated on a hill, El Rayo, which yielded a wealth of graves most richly stocked with pottery vessels, figurines, and jewelry. It is principally through study of the burial customs and mortuary offerings that Porter attempts to reconstruct Chupícuaro culture. In all, 390 burials and 1305 complete, or nearly complete, pottery vessels were analyzed. No living quarters or refuse deposits were found, but fragments of burned adobe suggesting floors or walls, alignments of stones, and a stone-lined drain suggest that some type of simple building was done. The dead were buried in pits and many were scattered around clay lined hearths suggesting that ceremonial fires formed part of the funeral services, although cremation was rare. Bodies were most frequently interred in an extended position, but fragmentary burials, including those of skulls only, were not uncommon. Graves of men, women, and children were found, and several dog burials occurred. Liberal offerings, consisting of pottery vessels, figurines, jewelry, musical instruments, and stone and bone artifacts, were placed with most of the human dead and also accompanied a few of the dog burials.

Description of the great quantity of pottery vessels, most of which were mortuary offerings, occupies a large portion of Porter's report. She notes that Chupícuaro ceramics exhibit thick durable walls, and are standardized in type of clay and tempering materials, in shape, and in the use of geometric designs whether incised or painted. Approximately one-half of the vessels are classified as Black Ware; the remaining specimens are divided among the following types of painted wares: Red-Rimmed, Red ware, Black and Red, Brown-on-Red, Red-on-Buff, Black Polychrome, and Brown Polychrome. The shape, size, and decoration of each type is described and typical examples are illustrated. Each ware is further discussed relative to its distribution in time and space and its probable relationships to ceramics of other areas. An appendix by Howel Williams describes the tempering of Chupícuaro sherds.

Hand modeled human figurines of clay were abundant in graves as well as in general digging and on the surface, and are described and discussed in detail. Less numerous were implements, ornaments, and musical instruments of clay, bone, stone, shell, and turtle shell.

After analyzing the specimens typologically and stratigraphically, and comparing them with other archaeological remains — especially those found in the Valley of Mexico, Porter summarizes the results of her study. Some of the salient features of her summary are as follows:

The Chupícuaro material can be divided into 3 phases, although the whole occupation shows no drastic or sudden changes. It cannot be classified as Tarascan for it lacks typical Tarascan copper and gold metallurgy, ceramics, pipes, and architecture. Direct or indirect contact with the Valley of Mexico, noted especially in pottery and figurines, was sufficiently close to make possible correlation of Early Chupícuaro with Ticoman III, Cerro Tepalcate, Cuicuilco, and Teotihuacán I. This would place Early Chupícuaro in the late Formative horizon, dated somewhere between 500 B.C. and A.D. 300. A Transitional phase is postulated at Chupícuaro but it is poorly represented. Late Chupícuaro was probably a continuation of the Early phase with few or no changes in the basic pattern of living. It was, however, marked by increased exterior relationships. Again through evidence based primarily on the study of pottery and figurines, Porter correlates the Late Chupícuaro phase with Valley of Mexico chronology. It is equated to Teotihuacán II, the early Classic horizon, dated approximately A.D. 300-500. No light is shed upon the origin of Chupícuaro culture, nor upon what happened at Chupícuaro during the time of the great cultural flowering of the Classic horizon in Mesoamerica.

Porter's monograph performs a great service in describing in detail the archaeology of Chupícuaro, and in fitting it into the general framework of Valley of Mexico archaeology, thus anchoring it in time. Her deductions seem quite sound. The text of the report is, in general, very ably presented. However, in my opinion, the pottery descriptions would have been improved by a series of drawings of shapes and decorative motifs placed adjacent to the written descriptions. Also, the inclusion of all unpainted vessels under "Black Ware," when it is stated that specimens vary from brown to black does not appear to be consistent. The quality of the illustrations varies greatly. Plans of the excavations are not uniformly oriented, and the range in scale is great. Plan 4 is so small that it is of little value. Laboratory photography of pot-

tery vessels and other items is satisfactory, but the field photography is not up to the same standard. Material from the reports of several other investigators who have worked in western Mexico (Brand, Caso, León, Lister, Noguera, Osborne, and Pepper) might have made the distributional sections more significant. Reports referred to are not included in the bibliography.

The importance and good qualities of the report far outweigh the minor faults I have noted. Porter is to be commended on completing this tedious study and thus adding a significant chapter to the literature pertaining to the archaeology of western Mexico.

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Excavations at Yagul, I. JOHN PADDOCK, TOM SWINSON, FERNANDO HORCASITAS, RICHARD GEORGE, JAMES P. OLIVER, DONALD BROCKINGTON, AND C. CHARD MEIGS. Mesoamerican Notes, 4, Department of Anthropology, Mexico City College, Mexico, 1955. xvi+92 pp., 41 figs. $1.50.

The Valley of Oaxaca and surrounding territory has long been recognized as one of the most intense cultural climax zones of Mesoamerica. In spite of considerable recent excavation, principally that of Caso and his associates, at Monte Albán and Mitla, there remain many lacunae in our understanding of the culture history of this key area. As is frequently the case in Mesoamerica, knowledge of the cultural content of the Classic (Monte Albán IIIA-B) is fuller than for the 2 ends of the continuum: the earliest Preclassic (Monte Albán I) and the Postclassic (Monte Albán IV-V). The Late Postclassic is especially confused; a systematic application of the direct historical approach seems called for but so far has not been undertaken on a major scale (compare Highland Guatemala).

In 1954 the anthropology department of Mexico City College decided to focus the major attention of its already established Oaxaca program on a fairly large, rather badly pillaged ceremonial center located on a striking eminence about 4 km. east of Tlacolula, known locally, among other names, as Yagul. Three seasons, under the leadership first of Bernal and later Paddock, totaling approximately 18 weeks, had been completed when this preliminary report appeared. The results of the fourth season (winter 1956) should be appearing shortly. Yagul was selected principally because work there promised to cast light on the poorly known post-Monte Albán phases. Although results are incomplete, the project for the most part seems to be living up to expectations.

The present study was prepared and edited by various students who participated at different times in the project, and, like all collaborations of this kind, suffers somewhat from a lack of consistent over-all integration. It includes an introduction (Paddock) briefly stating aims and problem conception; a rather sketchy presentation (Swinton) of the ecology; a useful re-editing of the 1580 *Relación de Tlacolula y Mitla* (English translation by Horcasitas and George); a summary description (Paddock) of the actual work of the first 3 seasons; a special discussion (Oliver) of architectural similarities between Yagul and Mitla; brief miscellaneous sections on place names, the tombs (Brockington), the technology of the *greca* mosaics (Meigs), and the ceramics; and a concluding chapter containing some general observations by Paddock.

Since the work is clearly a series of preliminary studies, it would be unfair to subject it to the same standards of criticism which normally apply when reviewing a definitive report. The following observations, however, seem justified. The lack of an adequate site plan is one distinct drawback, not fully made up for by 2 incompletely labeled aerial photos. Considerable effort might have been spared if the excellent Mitla greca diagrams of Seler had been reproduced, rather than a whole new set of drawings prepared; the repetition of the practically identical Yagul Patio 2 plans (Figs. 29, 33) also seems superfluous. The lack of a section adequately reporting on the ceramics is particularly regrettable, but the "shadow of Monte Albán" explanation given (that the Yagul analysis is purposely being delayed until a reasonably complete typology for the Monte Albán ceramics is available) seems justified. A genuine concluding summary, presenting the major tentative conclusions reached so far, including a more definite hypothesis on the site's temporal relation to Mitla, would have enhanced the report.

These are minor points. A more important interpretive criticism concerns a still all too common manifestation of culture-historical naïveté: the direct equation of *style*, in ceramics, architecture, painting, and so on, with a specific *ethnic group*, in this case "Mixtec" style being equated with the speakers of the Mixtec language. Once this correlation is accepted, a series of perhaps unnecessary problems arise, to which considerable space is devoted (pp. 80-6). They can be summed up in a somewhat oversimplified fashion. Why, since the latest cultural levels at Yagul are "Mixtec," is there no record of this immediate area ever having been occupied by Mixtec speakers? Precisely the same problem has confronted students of Mitla; the commonest explanation advanced by Caso and others invokes Mixtec (actually Cuilapan, since the Mixtec *cabeceras* were never united) political domination. But Paddock himself may come closer to the true solution when he suggests as an alternative (p. 82) that "the Zapotec of Mitla used Mixtec pottery," that is, manufactured pottery of "Mixtec" type. Although only further excavation can really solve this problem, a reasonable hypothesis would hold that in late pre-Hispanic times the style called "Mixtec" (because of its most typical development in towns of that affiliation) had largely superseded the earlier Monte Albán IV style throughout the Valley region. Although this style (actually one variant of a much broader "Mixteca-Puebla" style horizon) probably diffused to the Zapotec speaking communities via the neighboring, and encroaching, Mixtec, it seems unlikely that it was ever entirely restricted to groups speaking dialects of this latter speech. If this interpretation be accepted, then the existence of "Mixtec"

levels in a non-Mixtec speaking zone, and the presence of "Mixtec" paintings on the greatest of the Zapotec sanctuaries should cause no surprise. This hypothesis might also explain why no true "Zapotec" (Monte Albán IV style) codices have been discovered.

Yagul is obviously a site of great importance which was occupied at least intermittently from Monte Albán I times until well into the Postclassic. Its close relationship to Mitla, on the one hand, and its somewhat remoter ties to Monte Albán, on the other, place it in an exceptionally favorable position to clarify certain still obscure points of Oaxaca archaeology. The Mexico City College group is to be commended for their prompt reporting of this significant project, the further results of which will be awaited with great interest by all students of Mexico's past.

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Antiguales (Altertümer) der Paya-Region und die Paya-Indianer von Nordost-Honduras. (Auf Grund einer geografischen Erdkundungsreise im Jahre 1953). KARL HELBIG. Beiträge zur mittelamerikanischen Völkerkunde 3, Hamburgisches Museum für Völkerkunde und Vorgeschichte, Hamburg, 1956. 40 pp., 12 figs., 3 pls., 3 maps.

In 1953 Helbig made a geographical reconnaissance of northeastern Honduras, starting from Danlí and traveling by a circuituous route to the lower Río Aguán; from there he followed the coast as far as the Río Cruta, with side trips by foot and canoe up the rivers. The region has only in part been visited before by archaeologists, including Spinden, Strong, and Stone. Some new archaeological data were accumulated by the author, but no sites were observed in the easternmost part of the region, that is, along the Caratasca Lagoon, though some minor artifacts which had come from there were inspected.

The report is presented in 3 chapters: 1, Archaeological Discoveries; 2, Previously Known Archaeology; 3, The Paya. Chapter 1 is of chief interest to archaeologists as it offers descriptions of a number of artifacts in private possession, and reports on "new" sites on the Paulaya, Plátano, and Patuca rivers. Investigation of a cave near the Río Warunta gave no archaeological results.

A new site, Antigual Guatemala, in the Montaña de El Carbón seems to be important, a large site with foundations of 6 to 8 rectangular structures of waterworn rocks. On the ground between the structures are big, flat stone slabs, eight of them arranged in a line running east-west. A sculptured rock at the site, with geometrical figures, was apparently held in some awe by the Paya Indians in the author's party. Other sites near El Carbón have remains of structures similar to those at Antigual Guatemala. A couple of small cylindrical stone columns resemble one found by Doris Stone at Travesía.

Artifacts from along the Río Paulaya have found their way into private collections in Honduras. They are chiefly 3-legged metates of all sizes, and unpainted pots and sherds of types which are also known from the Bay Islands. On this river the author observed several sites with the usual remains of stone structures and paved roads. On Río Plátano it was not possible to localize the big site which has been described by Spinden (1924, *21st Internat. Congr. of Americanists*, Göteborg). However, important new observations were made, especially on a beautiful rock carving, smaller than Spinden's from the Río Claura, but perfectly corresponding in style. A boulder farther up the river was inscribed with a design which is known from polychrome pottery of the Yojoa and Sula regions, and from Salvador; additional facelike designs and concentric rings near the water's edge can be duplicated by rock carvings from South America and the West Indies. Helbig takes the opportunity of mentioning the rumors of a reputed "Ciudad Blanca" near the Río Plátano, with due criticism.

Chapter 2 is an enumeration of formerly known archaeological features of the region. Most of these have been published by Spinden, Strong, and Stone. New material on sites on the Río Sico and Río Paulaya is quoted from letters to the author from Frank Jones, an American resident in Sico. Here is surprising news of an ancient habitation and burial complex near Alazán, which extends for "some dozen kilometers" along the Río Sico.

In Chapter 3 the author expreses the opinion that Carib culture is responsible for the artifacts and archaeological sites in this coastal region. The Mosquito, who constitute the majority of the present population, were invaders from Colonial times, pushing out the Paya who are possibly descendants of the people to be held responsible for the *antiguales*. After a brief summary of Spinden's views on the Chorotega, and Lunardi's theory of Maya predominance throughout Honduras, Helbig gives a historical sketch of the region, and an enumeration of the places which are inhabited in our time by Mosquito, Sumo, and Paya Indians, with a very sketchy outline of the ethnography of the Paya. That the Paya of the time of the Conquest, though agriculturists, should have no knowledge of the digging stick, seems hardly credible, although Helbig seems to believe so, on the grounds of Goicoechea's description of 1811.

All in all Helbig's work, with its new archaeological data, its historical sketch, and its precise enumeration of the present areas of the tribes involved, presents important facts which are very valuable contributions to our knowledge of this little explored region of Honduras.

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Modoc Rock Shelter: Preliminary Report. MELVIN L. FOWLER AND HOWARD WINTERS. Faunal analysis by Paul W. Parmalee. Report of Investigations No. 4, Illinois State Museum, Springfield, 1956. 58 pp., 16 figs. $0.25.

One of the handicaps to the analysis of the preceramic cultures in the northern Mississippi Valley has been the absence of deep sites which would provide stratigraphic distribution of artifact types. This shelter is an extremely important one as it has evidence of a considerable span of time from the Archaic to Late Woodland. A series of radiocarbon dates from 2 laboratories has been correlated with distinctive soil zones and cultural complexes.

The authors have presented a brief statement of the cultural materials from the several soil zones and a comparative statement, particularly on the projectile point forms. A difficulty here is that Zones II to IV are each 5 to 6½ feet in depth and in the final report a more accurate allocation of objects within the zones should be made. Fowler has attributed a contracting stem projectile point to Zone I but I would prefer Howard Winters' interpretation that it probably belongs to the materials of Zone II. This form is compared to the Hidden Valley point with which it has a good typological similarity, and to the Gypsum Cave point with which it does not have such a close correspondence. The authors have overlooked the second report on the Hidden Valley shelter illustrating additional material from the lowest level (*Missouri Archaeologist*, Vol. 11, Nos. 3 and 4). It is doubtful if any of the artifacts in Zones II to IV are as early as the 9000 year average for 2 dates from the bottom of Zone II might indicate. I am not certain that the materials dated are necessarily the same age as the cultural material. They were not artifacts, specific hearth charcoal, or the discarded remains of organisms used as food.

The comparison of the Modoc projectile point sequence with the Carlson Annis Mound in Kentucky is a bit difficult for, although the words used to describe the point attributes may be the same, an examination of the illustrations of the points for these 2 sites is not particularly convincing for a close relationship. Furthermore, neither Webb's nor Fowler's analyses of point forms are of an order that will allow for precise correlations. The projectile forms from Modoc should be compared with those graphed in the recent publication by J. A. Ford and C. H. Webb on the Poverty Point site. Ford and Webb indicate a time position for the contracting-stem, broad-bladed point which is markedly later than is claimed in the Modoc report but which conforms rather well to its position in the Stallings Island site. The time position of this form should be about 3000 to 5000 B.C. and not before 6000 B.C., as the Modoc authors have pleaded. At this earlier date there should be Dalton, Meserve, and forms of the Plano complex. Still earlier levels in this region should produce fluted blade forms which are known in collections from the area. The claims made for this site have been used by some archaeologists to support the idea that the Archaic pattern is as early or earlier than the fluted blade sites. So far, sound evidence for this has not been produced.

The report is certainly correct when it says that, "The Mississippi was probably much larger, due to the water of the melting glacier, and swamp areas were more extensive than today." The Mississippi was not only larger, but higher. The Festus Terrace was formed during the Mankato advance which covered the Two Creeks forest bed, and has an elevation of just under 420 feet in the area of the Modoc Shelter. The excavated area of the shelter in which the deep trench was cut begins at the surface at the 415 foot elevation and continues down 18 feet to the 397-foot level. This means to me, if these physiographical correlations and radiocarbon dates are right, that the bottom level of the shelter was under 23 feet of water at approximately 8700 B.C. I understand that the Illinois State Museum has called in M. M. Leighton for an analysis of the physiography. It is to be hoped that a clear correlation can be established between the archaeological complexes and the late Pleistocene events in the area.

It is my interpretation that the radiocarbon dates for the bottom part of Zone II are probably earlier than the artifact complex of the zone which includes the Hidden Valley point. The Zone I deposits do include evidence of man, but at the time the report was written had not produced distinctive artifacts of the Early Archaic which follows the paleo-Indian fluted blade period in the east. I believe that the authors have overemphasized the antiquity of the cultural assemblage they have illustrated.

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New World Archaeological Foundation, Publication No. 1. New World Archaeological Foundation, Orinda (California), 1956. 42 pp., 3 illus., 1 map.

A new archaeological foundation is always welcome, particularly one that has succeeded in obtaining sufficient funds for several seasons of reconnaissance and excavation in an important and little known zone like Chiapas. The New World Archaeological Foundation is to be congratulated on completing its first years of field work and getting its reports, preliminary though they may be, so promptly into print.

The contents include an introduction by the president of the foundation, Thomas S. Ferguson; a report on reconnaissance in west-central Chiapas, by John L. Sorenson; an account of sites in the eastern highland and the Chiapa de Corzo and Acala regions, by Edwin M. Shook; and a summary of investigations at Chiapa de Corzo by Gareth W. Lowe. Shook's sections and some of the others', too, are fairly detailed; however, Sorenson and Lowe both refer to unpublished manuscripts which contain more details. It is hoped that the foundation intends eventually to publish these, for useful though this publication is, it is still fairly skimpy to represent the results of 4 or 5 seasons in the field, and it is particularly short on illustrations.

Although Sorenson lists at least 4 problems of Classic and Postclassic times that they hope to elucidate, the foundation's announced concentration of interest is on the Preclassic. Probably the richest deposits of this horizon that they discovered were at the Puerto Mexico Ruiz site, which yielded pottery, datable charcoal, vegetable and fruit seeds, bones, shell, and stone artifacts. A radiocarbon date was obtained of 1700±500 years, or about A.D. 255. Shook predicts that further stratigraphic tests there will define sequential phases of the Preclassic. This is welcome news, for so much of what we know, or hope we know, about the Formative period (a term all 3 writers pointedly avoid) comes the hard way, through laborious typological comparisons at scattered sites.

As A. V. Kidder points out in a letter quoted in the introduction, 3 officers of this foundation have 3 different favorite theories regarding the way in which native civilizations developed in the Americas, so presumably it is not only the Mormons in the program who must keep their Foundation reports, according to the agreement, "purely factual." They have managed this satisfactorily, although Ferguson perhaps skates closest to religious ideology when he calls the Toltecs "People of Bountiful" and Huehuetlapallan "ancient, ancient Bountiful land." One also detects what must be more than purely archaeological zeal when he states that solving the identity of the Preclassic inhabitants of the upper Grijalva [a task most archaeologists would consider well-nigh hopeless] "may well have far-reaching implications and results for the general welfare of the present inhabitants of the earth."

The New World Archaeological Foundation is now or shortly will be the only substantial North American institution devoted exclusively to research in Middle American prehistory. As such it is badly needed in archaeology, its responsibilities are weighty, and we wish it good fortune.

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Excavations on Cape Haze Peninsula, Florida. RIPLEY P. AND ADELAIDE K. BULLEN. Contributions of the Florida State Museum, Social Sciences, No. 1, Gainesville, 1956. 56 pp., 8 figs., 6 pls., 5 tables. $0.75.

This volume inaugurates a new series by the Florida State Museum, devoted to anthropology and history. It will provide another regional outlet for research being carried out in this area which boasts more professional archaeologists than many other states twice its size.

The Bullens in 1954 made a series of 5 test excavations, mainly in shell middens, in the area south of Tampa Bay on the Cape Haze Peninsula, in Charlotte County. They also surveyed 3 other sites in this interesting section just north of the Glades area.

Despite the fact that the work was of a preliminary nature and the artifactual remains were not too numerous, a regional sequence was established, although parts of it are quite tentative. The sequence begins with a slight representation of the Orange period, followed by a transitional or Early Post-Orange period. The Perico Island period is followed by Weeden Island and Safety Harbor influenced periods. The Historic interval is represented by Spanish Mission Indian and Seminole occupations.

This sequence, while based on limited data, confirms that established nearby and should provide a good framework for future research. The Bullens have added another worthwhile, though brief, document to Florida prehistory.

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Poverty Point: A Late Archaic Site in Louisiana. By JAMES A. FORD AND CLARENCE H. WEBB, in collaboration with Junius B. Bird and Michael Beckman. Anthropological Papers of the American Museum of Natural History, Vol. 46, Pt. 1, New York, 1956. 136 pp., 45 figs., 6 pls., 9 tables. $2.00.

Poverty Point, on the Bayou Maçon in West Carroll Parish, northeast Louisiana, is the type site of an archaeological phase of the same name. The artifacts found at Poverty Point, and at other sites in nearby Mississippi and Arkansas, are clearly ascribable to a late Archaic culture and period in the Southeastern United States. They include baked clay objects or "cooking stones," crude adzes or hoes, celts, tubular pipes, steatite vessels, 2-holed gorgets, bar atlatl weights, plummets, large corner-notched projectile points, and even a few fiber-tempered potsherds. Everything so far is in order. The peculiarities of the Poverty Point site and culture are the monumental earthworks. The word "monumental" is used advisedly. There are 2 great mounds at Poverty Point over 50 feet in height. Near the larger of the two (Mound A) is a series of concentric earth ridges which were once part of an octagonal enclosure some ¾ mile in diameter. The Ford and Webb report on Poverty Point leaves no doubt that these mounds and ridges, as well as a smaller mound on the site, are of artificial construction, being made up of basket-loads of earth. It also makes it quite certain that the Archaic assemblage of artifacts was in true association with the mounds and enclosure. The excavations confirm the previous Jaketown investigations (Ford, Phillips, and Haag 1955, Jaketown Site, *Am. Mus. Nat. Hist., Anth. Papers*, Vol. 45, Pt. 1).

The Ford and Webb report is a job of high technical quality which presents clearly, and with good illustrations, the Poverty Point field operations and findings. It brings together the accumulation of artifacts which have been collected over the years by Webb and Beckman. All that is now available to know is here. Unfortunately, it is not enough to provide a substantial basis for many of their interpretations about the Poverty Point culture. Let me add that these interpretations are as good as anyone could offer with present data, but

Poverty Point remains something more of an enigma than most Southeastern archaeological sites.

To begin with, the purpose of the 2 great mounds is unknown. In shape they are quite unlike the flat-topped "temple" mounds of later Southeastern cultures. Nor are they closely similar in form to the typical "burial mounds" of the eastern United States. Their size defies excavation or thorough search for deeply hidden burials that would attest to an essentially mortuary function. Ford and Webb argue that they were giant effigies, in bird form, citing examples of the rock eagle mounds of Georgia as possible related constructions; but an examination of their excellent contour maps does not convince on the matter of the effigy interpretation. The ridges of the octagonal enclosure are from 4 to 6 feet in height and spaced at about 150 feet from crest to crest. Most of the surface artifacts were gathered from the ridges, and several cross-trenches were put through them in the recent digging. Ford infers from the cultural detritus on and in the ridges that the whole enclosure was a huge, planned arrangement of dwellings. Although this is a possibility, the case is weakened by the failure to find postmold patterns or other definite house constructional evidence. Furthermore, if the Poverty Point geometrical enclosure is a village or town plan, it is a situation unique in the archaeology of the eastern United States. At least the Hopewell geometric works of Ohio, which, as Ford points out, are the closest homologues to the Poverty Point octogan, do not seem to have been great planned living sites. An alternative explanation of the rubbish would be temporary encampments, over a longer period of time, during the building of the works.

Difficulties of interpretation also attend the excavations in Mound B, a conical tumulus about 20 feet in height lying 700 yards north of Mound A. (The second large "bird-effigy" mound, 1½ miles from Mound A, is known as the Motley Mound.) Mound B is of the size and general appearance of a typical Louisiana Marksville burial mound. Its internal structure was revealed as a series of superimposed earth fill mantles, each with a hard-packed surface but otherwise without architectural detail. An extensive ash bed was encountered on mound base, and a single identifiable fragment of human bone came from this. It is interpreted as a crematory fire. As no other human remains were found in the mound, it may be that cremation was the sole mode of disposal of the dead in the Poverty Point society. It also may be that a combination of antiquity and soil conditions has done away with all skeletal remains, or that Mound B was not a burial or mortuary place. This absence of burials in what appeared to be a burial mound was also noted at the Jaketown site.

The radiocarbon dates on Poverty Point culture range from 1250 to 100 B.C., and Ford selects 800 to 600 B.C. as the preferred dating. This harmonizes with what we know of late Archaic dating estimates elsewhere in the Southeast and also places the construction of Poverty Point about contemporaneous with the earliest Hopewellian dates of the north. Ford emphasizes Hopewellian connections, or, even more specifically, Ohio Hopewell connections. Certainly the earthworks and the pottery figurines suggest Hopewell more than any other entity in the prehistory of the east at this time; yet I feel that his hypothesis of Hopewell conquerors subduing, organizing, and directing a local population in the building of the Poverty Point mounds pins things down too specifically, considering the limitations of the data. It is still a possibility, I think, that an early stimulus for mound building came into the lower Mississippi Valley from the south, that is from Middle America, and that the Poverty Point mounds and embankments are earlier than those of the Ohio Valley.

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Pipeline Archaeology: Reports of Salvage Operations in the Southwest on El Paso Natural Gas Company Projects, 1950-1953. Edited by FRED WENDORF, NANCY FOX, AND ORIAN L. LEWIS, with Introduction by Jesse L. Nusbaum, and sections by 14 contributors. Laboratory of Anthropology and Museum of Northern Arizona, Santa Fe and Flagstaff, 1956. xviii + 434 pp., 260 figs., 5 tables. $4.00.

It is not easy to appraise this book or to do justice to it in the terms of a conventional review, because it arises out of unprecedented circumstances, and is therefore something new under the sun. It is the first published report on the procedures and results of mechanized archaeology, of the sort that has recently been pursued in anticipation of the destructive activities of highway building and pipeline laying. As such it demands an approach suited to its peculiar nature, and to a consideration of the special circumstances which surround a project of this sort, unorthodox as it is in terms of the "scholarly" procedures endemic to standard archaeological custom.

The book records the archaeological activities that accompanied the laying of gas pipe from western Texas through western Arizona by the El Paso Natural Gas Company, which enthusiastically collaborated in the work and contributed generously to its accomplishment. In appraising this operation there must first be sought an answer to the question of the value of results in relation to costs; and secondly, an estimate of the validity of the procedures pursued in the light of conditioning circumstances.

First, then, what are the results? They are, in sum, the completion of surface surveys along about 900 miles of right-of-way, with the recording of over 300 sites, of which about 50 were wholly or partially excavated. For the most part the surveys were necessarily one-dimensional and did not extend beyond the actual right-of-way, an unfortunate limitation that could hardly have been avoided under the circumstances. On the positive side is the fact that the surveys followed a traverse through the heart of the northern Southwest, with spurs to southwestern Colorado and central Arizona. Some of this area was already well-known archaeologically, some was virgin, but never since the railroad and geological surveys of a

century ago has there been an investigation of such wide geographical scope serving to sample so many archaeological provinces of the region, without the bias of omphalopsychic concern for any one of them.

Out of this setting arises a compulsion and an opportunity — to save what is possible from the maw of the trench-digger; and to utilize its voracity in operations heretofore regarded as properly served only by spade and trowel. Thus, the question is not whether the excavations should have been done, because they were going to be done anyway, but whether they were done with the utmost care under the circumstances, and whether they were codified and reported in the most comprehensible manner. Basic credit should be given to Jesse L. Nusbaum for his foresight in conceiving the salvage possibilities inherent in the proposed pipeline operation and for his effective action in convincing the officials of the gas company of the value of the scheme. And it is to their credit that they displayed the vision and generous cooperation that made it possible.

The focus of this review should, however, be upon the volume reporting the operations, and it too presents some features differentiating it from the usual archaeological publication. There appears first an Introduction by Nusbaum, in which he relates the circumstances incident to the original plan and the steps taken to implement it. This has much value as an "historical" document. Then follows a brief outline by Wendorf on the field organization, accompanied by 6 good maps. The arrangement of the text, which has been dictated largely by the method of excavation, is not in every respect a happy one. Each of 7 operations is reported separately, the surveyed sites being described briefly in numerical sequence, while the excavated sites are individually described, sometimes rather summarily but often in exemplary detail. It would have been helpful had the sites been consolidated into groups and discussed on a regional or phase basis. In some sections of the report this is done very adequately, but in others the survey data provide little more than edited field notes. Moreover the manner of presentation results in no less than 44 separately authored subdivisions, composed by 14 contributors. This is not an organizational delight and constitutes a librarian's nightmare.

In only 2 sizable sections (that of the west-central New Mexico part of the Permian-San Juan Project and that of the Wingate Products Line) have the data been consolidated into cohesive monographs under unified authorship. It is unfortunate that this method was not used for the other reports, but it is perhaps unfair to insist too strongly on this point, since the pressure of time and the dispersal of the writers may have made such consolidations difficult. The discussions included in the sections mentioned very adequately appraise the significance of the work and relate it to general archaeological problems. But it is a pity that the volume lacks a final comprehensive summary tying the whole together, pointing up the problems solved, and emphasizing areas in which the surveys have indicated fruitful potential for further investigation. Several such areas were found, for example the "lithic culture" at site NA 4282, near Ashfork, and the indications at site LA 2567, near Los Lunas, of an archaeological region hitherto unrecognized; but the references to these are pretty well buried in the text.

The book is handsomely printed in lithograph and the illustrations are copious and good. The cover is attractive and it is unfortunate that the artist is not credited. The volume seems remiss in its omission of all personal acknowledgements, for numerous anonymous individuals must have contributed much to the final result. There is no fly leaf, the table of contents is set in too small type, and there is no list of illustrations. The alphabetical listing of ceramic types is of little value without page references and without full descriptions of newly named types. While there is an index of sites, there is no topical index — a serious omission for a diffuse compendium of this nature. There are some misspellings and typographical errors, and some confusion in figure captions, in footnote placement, and in site references — site LA 2517, which was not excavated, is shown on Figure 2 as excavated and is displaced by about 60 miles; the number LA 2706 is ascribed to 2 sites, and an incorrect page reference to it is given in the index. But these errors are not in themselves fatal.

In spite of certain shortcomings, the volume does represent a significant precedent, and evidences the hopeful fact that archaeology and private industry can be bulldozed into cooperation to their mutual advantage. What it suggests for the future is perhaps as important as its record of achievement, and its very faults can serve as guides for their own elimination in subsequent publications. Great credit is due both to those who did the work in hot haste before the advancing machines as well as to those who made it possible. Most Southwesternists will find much of value in it.

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Pottery Types of the Southwest: Wares 5A, 10A, 10B, Tusayan Gray, and White Ware, Little Colorado Gray, and White Ware. HAROLD S. COLTON. Museum of Northern Arizona, Ceramic Series, No. 3, Part a, Flagstaff, 1955. 89 pp., illus. $2.00.

Pottery Types of the Southwest: Wares 5A, 10A, 10B, 12A; San Juan Red Ware, Mesa Verde Gray, and White Ware, San Juan White Ware. LELAND J. ABEL. Museum of Northern Arizona, Ceramic Series, No. 3, Part b, Flagstaff, 1955. 66 pp., illus. $1.75.

The 2 works under review constitute segments in the revision of the earlier *Handbook of Northern Arizona Pottery Wares* (Colton and Hargrave, 1937, Mus. of Northern Ariz., Bull. 11).

Each paper contains a foreword by Colton setting forth the reasons for issuance of the material in its present looseleaf format. The major portion of each section consists of descriptive material. Each ware is introduced by

a page of general discussion which includes background, time range and culture stage, areal range (including a map), general description, cultural associations, and series, if any, as well as a key to the types included in the ware. Each type is described on a separate page. One or more pages of drawings or photographs illustrate most types, adding greatly to their utility and value.

The majority of type descriptions are sufficiently full and accurate so that little trouble should be experienced in identifying most sherds. However, one or 2 types appear to be too inclusive. For example, as defined and illustrated in Colton, Kana-a Gray (Ware 8A, Type 5) would appear to be too variable to remain as one type. Field experience elsewhere has shown that the narrower clapboard type of neck-banding is late Pueblo I or early Pueblo II, and suggests that segregation into 2 types might prove useful and valid.

Abel's reanalysis and description of Mesa Verde area wares does much to clarify the previously confused typology there. Specifically, segregation of Cortez Black-on-white and Morefield Black-on-gray from Mancos Black-on-white has been shown to be valid in both field and laboratory.

Except for Bluff and La Plata Black-on-red, no indigenous decorated types are listed for the Mesa Verde area between A.D. 850 and 900. There is a possibility that the terminal dates for some Pueblo I black-on-white types is too early or that the beginning date of Cortez Black-on-white should be pushed back.

While somewhat apart from the main purpose of the compendium of type descriptions, Abel's introductory and concluding discussions are a useful addition to the work. It would seem desirable to include such a discussion for each of the major areas to be covered.

The present works are primarily designed as aids to sherd analysis. Form description terms refer only to general categories of shape. Rim sections are given by a formula for which one must refer to Colton and Hargrave's 1937 Handbook or to Colton (1953, *Potsherds*, Mus. of Northern Ariz., Bull. 25). Either the rim form chart should be included with each section, or else rim section drawings (which are more accurate) should be included in the type descriptions.

While the looseleaf format invites rearrangement by analogous types (Colton 1953) or in some other fashion, the carry-over from the previous handbook of the Key feature, arranged by ware, series, and type, constrains one to maintain the present structure intact. Inclusion of an "analogous type" section in the description of each type would permit an individual to construct an "analogous type" key for himself.

Notwithstanding such minor flaws, the 2 publications under review are very important additions to the Southwesterner's working library, and it is to be hoped that additional parts will soon be forthcoming.

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Higgins Flat Pueblo, Western New Mexico. PAUL S. MARTIN, JOHN B. RINALDO, ELAINE A. BLUHM, AND HUGH C. CUTLER. Fieldiana: Anthropology, Vol. 45, Chicago Natural History Museum, Chicago, 1956. 218 pp., 85 figs., 1 table. $4.50.

This report should be the next to the last, or possibly the next to the next to the last, of the "Forsyth Saga" of the prehistory of west central New Mexico. The anthropology division of the Chicago Natural History Museum, under the direction of Paul S. Martin, can once again proudly receive plaudits from other anthropological institutions for its prompt and excellent publication of its southwestern archaeological expeditions. This report describes the excavation during the 1953 season of a pueblo about 3 miles north and east of Reserve, New Mexico. The principal objective was the latest pueblo in the region, a site of the Tularosa phase, which Martin believes to have been occupied in 1175 or 1200 and abandoned around 1250.

As in previous volumes by Martin, Rinaldo, and their associates, this monograph is carefully organized. There is a general introduction, then a description of the architecture, then chapters on the artifacts, and the cordage and textiles, followed by one on pottery that includes the authors' usual bar graph of the pottery found in the rooms and a pottery breakdown by room fill and floor. Cutler includes a clear discussion on corn in his chapter on plant remains. He explains how to measure row number from cobs and from single ears of corn, techniques which should be useful to archaeologists who do not have the aid of an ethnobotanist. A chapter on burials is followed by the summary and synthesis. The material is so presented that others can use the data to work out their own evaluation of the site.

I cannot completely agree with Martin's statement that "the Mogollon culture at about A.D. 1000-1250 is oriented more to the areas immediately to the south and west of the Reserve area" (p. 191). The blending of Mogollon and Anasazi culture had been going on in the country immediately to the north for several hundred years before the Higgins Flat Pueblo was built. By the year 1000 the *genetic* background of the occupants of Higgins Flat Pueblo may well have been neither pure Anasazi nor pure Mogollon, but a mixture of the two. Certainly the cultural remains suggest this, and, although I agree with Martin that the Mogollon was the dominant element, I cannot agree that the influences are more southern and western than northern. It is probably true that ¾-grooved axes, paint palettes, shell jewelry, and some of the agricultural products, the main items listed as southern, may have come originally from the south and west, but, with the exception of trade shell, by 1000 to 1250 the Mogollon had completely accepted these innovations as their own.

Southwesternists have often discussed the possible cause or causes for the abandonment of this area that was lived and farmed in for over 4500 years. Martin points out that a changing climate may have been responsible. This agrees with the thinking of Hack and Bryan,

who have spoken of the gradually drying climate of the 1200's that culminated in the 1276-1299 drought. Martin also notes that today around Reserve, after dry winters and springs such as those of many recent years, the temperature drops to 5 or 6 degrees below freezing as late as June 15, or even later. This often results in too short a season for growing corn. Dry climate and extreme change in daily temperature may well have been the cause of the abandonment of the higher mountain communities and the increasing number of large sites in the lower elevations, such as the San Francisco River valley at Reserve, where crops would have had a better chance to mature. Whether this is the cause of the later abandonment of the entire country by pueblo people is not yet known. Some of the latest villages in this region seem to be defensively constructed pueblos in the higher mountain valleys. If this is true, then it is hard to believe that the climate in the late 1200's was the only cause of abandonment. The fact that no pueblo groups ever returned to stay and use the land once the drought had broken also suggests that the drought was not the only cause.

This report is a carefully analyzed and well documented record of a Tularosa phase site. It adds another phase to the sequence of cultural development in west central New Mexico which Martin and his associates began to study more than 15 years ago. They are to be congratulated on carrying out this long-term study which has produced such a wealth of knowledge about a previously almost unknown area.

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The Sawmill Site. A Reserve Phase Village, Pine Lawn Valley, Western New Mexico. ELAINE A. BLUHM. Fieldiana: Anthropology, Vol. 47, No. 1, Chicago Natural History Museum, Chicago, 1957. 86 pp., 32 figs., 1 table. $2.25.

This brief site report of work carried on under the direction of Paul S. Martin of the Chicago Natural History Museum contributes further to our knowledge of the archaeology of the Reserve area in western New Mexico. Results of excavation at the Sawmill site are presented by Bluhm in a simple and straightforward manner in which facts and conjectures are carefully kept apart. Withall, it is a technical report not intended for the layman, but one in which the nonprofessional will hardly bog down.

At the Sawmill site the outstanding feature, and the primary reason for excavation, was a large rectangular kiva, 10.5 m. long and 8.7 m. wide with a long ramp entrance on the east side. While this type of kiva was reported by Hough shortly after the turn of the century at 2 sites in the Blue River valley, Arizona, the only other kiva of this type that has been excavated was at the Wheatley Ridge site west of Reserve, New Mexico. On the basis of pottery seriation the Sawmill site is placed early in the Reserve phase, and on the evidence of instrusive pottery it may have been occupied around A.D. 950 or 1000. In the absence of treering dates, greater precision or certainty in dating cannot be expected from the data.

One might regret the fact that the final chapter does not contain a discussion of the wider aspects of the great kiva problem than are presented in the earlier discussion under "Architecture," or that the community aspect of the Reserve phase settlement pattern in Pine Lawn Valley is not presented with greater confidence. These are minor points which probably reflect the reviewer's bias rather than any inherent shortcomings in the report. Bluhm should be commended for a report in which the data are presented in such a way that they can be easily found and used by others, and for a report in which conjectures and interpretations are brief but suggestive, allowing the reader to make his own elaborations.

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Hidden House: A Cliff Ruin in Sycamore Canyon, Central Arizona. KEITH A. DIXON. Museum of Northern Arizona, Bulletin 29, Northern Arizona Society of Science and Art, Flagstaff, 1956. x+90 pp., frontis., 33 figs. $3.00.

Dixon has accomplished a commendable job of reporting on Hidden House, a 4-room site near the mouth of Sycamore Creek, a few miles north of Tuzigoot National Monument in the Verde Valley, Arizona. Working from someone else's notes, never an easy task, he covers the circumstances relating to the excavation and the associations of the various finds. In addition he describes in detail the objects recovered and presents considerable comparative information on the perishable material.

The site itself is typical of Verde Valley Sinagua sites within the period of A.D. 1150 to 1300, both in architecture and ceramics. The major item of interest recovered was an extended burial with a rich assortment of woven cloth and other objects, with which the greater portion of this paper is concerned. Associated with the burial were a number of pieces of cloth of various weaves and decorations, wood artifacts, baskets, pottery, a gourd container, and a few other objects.

Dixon points out that textile techniques in Arizona appear to be divided into 2 general areas, Anasazi and Hohokam, and he suggests that those of the "Western Pueblos" (as he refers to the late Verde Valley and Mogollon cultures) possibly originally were derived from the Anasazi with later additions coming from southern Arizona. Dixon cautions that the vagaries of publication may in part be responsible for some current concepts, some of which may be altered by additional data.

His use of the term "Western Pueblo" is unfortunate. This concept tends to weaken his analysis as it lumps 2 culturally distinct people, the Mogollon-Anasazi derived

Cibola Branch of the plateau of eastern Arizona and the unrelated Sinagua of central Arizona. As a result his comparative data and scatter diagrams are not separated into true cultural entities. He also refers to the Ventana Cave material as Hohokam, a debatable point.

Throughout his discussion of Hidden House material Dixon points to many similarities with the Anasazi. He also mentions definite differences such as warp predominance, painting being parallel to the warp rather than diagonal, a cloth quiver unlike any other reported, and breech cloths with the hanging end joined to the body of cloth while on the loom. Even in his scatter diagrams he points out there are "Western Pueblo" (actually non-Sinagua) sites that do not fit in with those of Hidden House and other Sinagua sites. I believe it is important to stress that the differences involved and the area of these exceptions occur among the Verde Valley and Flagstaff sites as well as the Tonto Ruins, as opposed to other "Western Pueblos."

These differences between Sinagua material and other "Western Pueblos" are not limited to the woven cloth. Dixon's "Western Pueblo" basketry specimens from Hidden House, Winona, and Ridge Ruin (Sinagua sites, 2-rod-and-bundle, bunched) differ from the Chevlon, Salt River, and even Ventana Cave variety (non-Sinagua sites, 3-rod, bunched). The great majority of compound arrows with wood points recovered and the presence of spiral feathering are highly significant and are also traits of the historic Yavapai of the same region. This combination of traits has not been reported in areas adjacent to the Sinagua in prehistoric times. It would be interesting to see what would result if the traits of the Sinagua were reanalyzed, separated from those of the "Western Pueblos," and then compared to the Anasazi and other groups.

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The Surface Archaeology of Butte Valley, Death Valley National Monument. WILLIAM J. WALLACE AND EDITH S. TAYLOR. Contributions to California Archaeology [No. 1], Archaeological Research Associates, Los Angeles, 1956. i + 15 pp., 3 figs., 2 pls., 2 tables. $0.60.

The Little Sycamore Shellmound, Ventura County. WILLIAM J. WALLACE, EDITH S. TAYLOR, AND OTHERS. Contributions to California Archaeology, No. 2, Archaeological Research Associates, Los Angeles, 1956. v+ 46 pp., 14 pls., 10 tables. $1.50.

A new mimeographed publication series is inaugurated with these 2 reports. Like other publications of this sort, the new series is apparently intended primarily for the use of local workers in western archaeology. It is gratifying to note the greater attention to scientific archaeology recorded in such local publications, although the small circulation and general impermanence of mimeographed material pose some problems for the scholar, principally the difficulties of locating and obtaining the reports. The present reports do not have a title page listing such essential information as the names of the editors, prices, or address where copies may be obtained. The first paper is not numbered as part of a series. Failure to present such routine information tends to limit the accessibility of the reports and hence counteract to some degree the principal aim of scientific publication.

In format, the publishers have obviously taken some pains to do a professional job. The editing is thorough and careful, and the copy is free of typographical errors, poor spacing, and similar faults. The illustrations are in general quite good, particularly the photographs which are big enough and well enough reproduced to have some value. The publishers have avoided the false economy of saving money by eliminating or hopelessly reducing the illustrations. The first paper does use some drawings made on a mimeograph stencil but the second paper has line cuts instead.

The first paper reports an archaeological survey of Butte Valley, a small (20 square miles) part of Death Valley National Monument. Within the area 26 sites were recorded, most of them small and temporary camp sites. At least 2 periods of occupation are represented, but detailed delineation of these is not possible because of the thin and scattered nature of the cultural debris.

The second paper reports excavations in an important shell midden on the southern California coast. The work was done by a 1952 class in archaeological field methods from the University of Southern California, and 5 of the students have collaborated with Wallace and Taylor in writing the report. The excavation sample includes 15 burials and 640 artifacts, of which 239 were manos and metates. The descriptions are systematic and detailed, and there is included a section giving anthropometric data for some of the burials.

Cultural relationships to the older metate-using horizons of southern California are general. Similarities to Topanga, Oak Grove, and Zuma Creek sites are noted, with the majority of traits shared with the Zuma Creek site only a few miles to the south. An age of perhaps 4000 to 5000 years is estimated for the beginning of the occupation, although no direct dating evidence is available.

A noteworthy feature is the general scarcity of projectile points in the Little Sycamore collection. Only 12 points were found, less than 2% of the artifact count. A similar scarcity of points has been reported for Zuma Creek and Topanga sites, and it seems to be diagnostic of the earlier southern California cultures. This fact has some bearing on the reputed "preprojectile point" or "nonprojectile point" cultures claimed to exist in southern California.

Such a detailed site report is a welcome addition to the California literature, which has been topheavy with culture names and hypotheses and very short on published data. West coast archaeology will be on a firmer footing when several more reports of this nature are available.

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Northwest Archaeology Number. Edited by RICHARD D. DAUGHERTY. Research Studies of the State College of Washington, Vol. 24, No. 1, Pullman, 1956. 101 pp., 27 pls. $1.25.

Traditionally the Pacific Northwest is an area of sparse archaeology. Standard sources have dealt with cultural reconstruction of the Northwest Coast and contiguous Plateau, but largely in a tentative manner. Admittedly, archaeological reporting and synthesis have been negligible. Published data are few, often frankly speculative, and frequently out of touch with current research. This volume is symptomatic of a more recent approach, illustrative of the intensive descriptive and synthetic activity now in process in the Northwest.

The 8 papers provide a much needed regional sampling. Individual presentations are quite uneven and, unfortunately, a preponderance of the data are of interest only to the regional specialist. Nonetheless, each study must be assessed as a significant contribution in documenting problems and areas hitherto unknown to Plateau and Northwest Coast archaeology.

There are 4 papers ("Survey of Rocky Beach Reservoir" by Daugherty, "Montana Western Region" by Carling Malouf, "Survey of Eastern Vancouver Island" by Herbert C. Taylor, Jr., "Two Surveys in the East Kootenay Region" by Charles E. Borden) in which the results of recent archaeological reconnaissance in the Northwest are summarized. Of extra-areal importance are the independent but overlapping surveys of Malouf and Borden. Both are concerned with a critical area geographically transitional between the Plateau and Plains.

An abbreviated report on a site on Puget Sound, "Old Man House" by Warren A. Snyder, is an outline of the archaeology of the well-known Bertelson site. The author offers an obvious first step in the development of a much needed local chronology. The material context is a late one, not inconsistent with the known regional ethnography.

In "Early Lithic in the Pacific Northwest" Douglas Osborne suggests a periglacial occupation of the Northwest which is typologically similar to the early horizons of the Plains and Southwest. In "A Post Contact Movement of the Kwakiutl" Herbert C. Taylor, Jr., and Wilson Duff utilize documentary and ethnographic data to demonstrate a southward drift of the Kwakiutl at the expense of the southeastern Vancouver Island Salish. Duff describes in "An Unusual Burial at the Whalen Site" a series of distinctive objects from the important shell midden at Boundary Bay, Washington. The author looks upon the inventory as reenforcing the suggestion of "Interior" orientation for the "Intermediate Period" as outlined by Borden for the lower Fraser River area.

This volume, then, contains locally directed and tentatively synthesized data which reflect the current descriptive phase of Northwest archaeology.

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Early Man in the Columbia Intermontane Province. RICHARD D. DAUGHERTY. University of Utah, Department of Anthropology, Anthropological Papers, No. 24, University of Utah Press, Salt Lake City, 1956. 123 pp., 1 fig., 4 tables. $1.75.

Archaeology of the Lind Coulee Site, Washington. RICHARD D. DAUGHERTY. Additions by Charles D. Campbell, Harold E. Culver, Lee G. Nering, and Betty Enbysk. Proceedings of the American Philosophical Society, Vol. 100, No. 3, Philadelphia, 1956. Pp. 224-78, 46 figs., 8 tables. $1.00 (for the complete number).

Daugherty states his purpose in the first paper as follows: "It is proposed to examine the problems related to the occurrence of Early Man in the Columbia Intermontaine Province, with particular emphasis on the Columbia Basin. Problems involving areal and cultural relationships, problems relating to dating and the establishment of a temporal framework will be dealt with in turn." The Columbia Intermontane Province as used here is a geological concept and as such is quite independent of any archaeological considerations. After a definition of the terms he proposes to use in the treatment of the cultural material, he proceeds to a discussion of the physiography of the province with observations on the climate, flora, and fauna. There follows a chapter on Early Man in western North America and the sources for geochronological dating of sites in the Columbia Intermontane Province. A section on Early Man in the Columbia Intermontaine Province in which intra-areal and interareal relationships are discussed is followed by suggestions on Early Man research, a summary, conclusions, and bibliography. A series of tables provide information on the climates of the province, Early Man sites in western North America (an extremely useful compilation), geological events, and the finds of Pleistocene and early Recent mammals in the Columbia Basin sub-province.

Daugherty's Early Man period ends at 4000 years ago. The area west of the 95th Meridian from Mexico to the Arctic serves as the environmental frame of reference for comparative discussion. In his artifact analysis Daugherty follows Krieger's terminology although he proceeds to what he calls a further refinement: "The term *form* will refer to any single artifact, the emphasis being placed on its diagnostic formal characteristics. The term *style* will refer to a *form* that is found to recur with some regularity, and therefore, may have cultural significance. In practice, then, if a form is found to recur with some regularity, and, as such, may have cultural significance, it may also be designated a *style*. When the temporal, spacial and relational factors (that is, historical factors) for a given style have been determined, such a style will then be given a *type* designation."

His discussion of the interareal relationships is limited, for all practical purposes, to the Great Basin area, although a portion of one paragraph is devoted to a discussion of possible similarity between the Lind Coulee and Lindenmeier sites.

The Lind Coulee site in Grant County, Washington, within the Central Plains section of the province was

originally discovered during the River Basin Surveys program and excavated in 1951 and 1952 under Daugherty's direction with the support of the University of Washington and the National Park Service. Resting on the basalt bedrock is Bed F, of sand, gravel, and angular cobbles. Bed E follows, thought to be of proglacial origin, "probably formed during the Mankato." Bed D "consists of up to eight feet of evenly bedded, firmly compact, water laid sand, containing artifacts and cultural debris." About 2 feet of culture-bearing debris occur in the upper part of Bed D. The remaining beds contain no artifact material and are of importance only in connection with geological dating efforts.

During the 2 seasons 186 artfacts were removed. In the absence of cultural stratigraphy the deposit is considered a single unit. There were 4 bone artifacts, three of them shafts (two broken, and one beveled at the end as though for hafting) and one a broken point with serrated edges.

Daugherty sets up 2 categories for his flaked stone implements based on the character of the edge, whether single or double beveled. He classifies his side scrapers into 2 groups, thick and thin (under 12 mm.); he sets up an "irregular" category in each class and assigns a style designation 1, 2, and so on, to each scraper group. His inventory includes end, both oval and elongate, keeled, and domed scrapers. I find it difficult to distinguish from his illustration between the domed and keeled variety. The 21 projectile points or fragments were evenly distributed throughout the site. The classification based on form is derived from 6 basal fragments. Stemmed and nonstemmed points occur. The stems are either tapering or straight sided with a rounded or straight base. The differences are not as clear in the photographs as in the artist's sketches. Daugherty calls attention to one stemless point which has a concave base and explores the idea that this might possibly be a faulty Folsom specimen. It is a flake point, as shown by the smooth surface of the nodular side, and is not Folsom.

Geological evidence suggests that this site was occupied following the recession of the last glaciation, but how long after it is difficult to say. An estimated geological age is given by Daugherty of between 6000 and 11,000 years ago, but one of his geological colleagues suggested "anywhere between 5000 and 25,000 years ago." The fauna is recent. Radiocarbon dates calculated by Libby from burned bone fragments gave an average of 8700± 400 years ago.

As a piece of field research, the Lind Coulee project is of a high order. I feel that the major weaknesses lie in the methodology by which the large physiographic provinces of the geologists are used as environmental frames of reference instead of using the more significant drainage systems and topographic features to which human activity at the stage of culture represented here is more closely related.

"Style," as Daugherty uses it, seems to be what most of us mean by "category." His "irregular thin flaked side scrapers" he designates as Style 1. It is difficult for me to see how the word "style" can be applied to any category which consists only of "irregularity" as a definition of its most significant attribute in a universe (culture) where regularity or repetitiveness is definitive.

Daugherty finds his projectile points "for the most part, entirely unique when compared with other projectile points from North America." I cannot agree with this evaluation, for a comparison of the photographs of the Lind Coulee points with those from O'Dell Lake show definite similarities within the expected normal range of variation. The biconvex crescent scraper, 2 examples of which were found, is distributed throughout the Great Basin and down into Southern California. This is the only artifact which Daugherty is willing to designate a distinct "type."

The use of the physiographic area concept includes the Fort Rock cave in the area along with the Wikiup and the O'Dell Lake site, both of which are in the Deschutes drainage. Fort Rock is a Great Basin site, and should under no circumstances be included with the others.

The conclusions in both studies are essentially verbatim. The author states, "in comparing the cultural materials from the early archaeological sites within the Columbia Intermontane Province, it was found that only very slight resemblances could be noted. Sites were found to bear closer resemblance to sites outside the area than to each other . . . the fact that we are dealing with a few sites scattered over a wide geographic area no doubt is partly responsible . . . the Oregon sites show the closest resemblance to the Northern Basin and Range sites. The Lind Coulee site resembles most closely certain Basin and Range sites as well as certain other California sites, but these resemblances are, in general, slight."

When Daugherty points out that the Oregon manifestations (mainly Fort Rock) are mostly closely related to those in the Northern Great Basin, that is exactly as it should be, because Fort Rock is a part of the Northern Great Basin. I see in the Lind Coulee artifact assemblage a variant of the Early Great Basin culture and consider its importance to be the extension of our knowledge of the distribution of this culture.

I would like to call attention to an inaccurate reference to my own work on the Lebanon site in Oregon (p. 257 of the Lind Coulee paper). The article which Daugherty summarizes presents a quite different record from the statement he offers.

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Archaeology of Humboldt Cave, Churchill County, Nevada. Robert F. Heizer and Alex D. Krieger. University of California Publications in American Archaeology and Ethnology, Vol. 47, No. 1, University of California Press, Berkeley and Los Angeles, 1956. 190 pp., 11 figs., 34 pls., 3 maps. $3.50.

This volume is a straightforward presentation of data along with adequate comparative citation and a somewhat too short concluding section dealing with the problem of regional differences in the Great Basin-Desert cul-

ture base. The authors are reporting work which unfortunately has gone unpublished for 20 years, even though the original field work was done in 1936, and the major portion of the artifact analysis and writing in 1937. This is simply another of the lamentably frequent cases where it was impossible for publication to follow research soon enough. The delay did, however, allow the authors to do some comparative analysis which would have been impossible until recently.

The report deals with the Humboldt Cave site, which was used as a storage cache rather than a habitation from shortly before the time of Christ until possibly historic times. From the debris in the cave and from a series of cache pits a remarkably wide variety of artifacts was recovered. The list includes over 2000 pieces of basketry, sheep horn sickles, bone awls (some L-shaped), many wooden objects including trowels, scraps of buckskin, woven skin, bird decoys, chipped flint, and other materials, as well as the bones of 19 bird and 17 animal species which are presumed to have been utilized for food. Subsistence also involved fish, as numerous fishhooks of 2 standard sizes testify.

On page 75 the authors present a chronological sequence based on stratigraphy and radiocarbon dates which is slightly modified from one prepared a few years ago by Heizer. The Granite Point and Humboldt cultures are identified as the earliest, probably from 9000 to 4500 B.C. These are followed, during the Altithermal, by the so-called Leonard culture which has been previously reported by Heizer, and at about 1500 B.C. by the Lovelock culture reported by Loud and Harrington. This sequence is extended by the Humboldt Cave occupancy, which is seen as continuing until occupation of the area by the northern Paiute tribes.

The major portion of the volume is given over to artifact analysis and comparison. The work here is quite competent. Attention is particularly directed to the section on basketry, where detailed descriptions and a rather careful classification extend our knowledge of Desert culture basketry considerably.

In a brief interpretive section the authors are concerned among other things with an effort to identify a direct cultural relationship of the historic Paiute to the Lovelock culture through the artifact remains. This identification is not successful. The authors conclude, on the basis of artifacts, that it is not possible to show that the northern Paiute have historical connections with, or were descended from, the Lovelock-Humboldt remains. I am disappointed that this search for relationships failed because I had expected that such identification would be demonstrated.

The major general contribution of the authors' joint effort is the beginning of a delineation or isolation of several trait complexes which seem to show that it will be possible to establish, on the basis of regional variations, several cultural provinces in the desert west. Certainly they have identified regional variation and a change through time in their consideration of several of the western cave sites. Specifically they note that there is a "generic culture substratum which identifies all the Desert culture sites." The traits of this substratum are "the deer rattle, medicine bag or pouches, twined tule matting, scapula grass cutter, perforated horn or antler arrow wrench, bird bone whistle, compound (cane hardwood) arrow, wood-handled flint-bladed knives, L-shaped scapula awl, straight scapula awl, digging stick, solid shaft fire drill, wooden fire hearth, game dart, and the use of caves for shelter and for caching valuable food and other items." Specific traits which they identify not with the generic substratum but with California Indians are "duck decoys, . . . small fishhooks, flat coiled basketry trays, crude shallow wooden bowls, pinenut beads, the technique of incised decorative design on bone artifacts, feather decorated fine-coiled basketry, and beads of marine shells." With the Southwest Basketmaker-Pueblo series "the tubular stone pipe with bird bone stem, curved grass cutting sickles of mountain sheep horn, hollow cane fire drills, flat wooden slab trowels, cylindrical open twined rush bags, flexible tule cradles, bark apron, and round hairbrush" are specifically paralleled. Even though the authors made this analysis in an attempt to discover where Humboldt cave remains belonged in relation to other reported sites, the implications of their analysis are more important perhaps than the allocation of one site. The Humboldt remains were, in their own words, "composed of certain generic western culture forms, a strong element shared with but not necessarily derived from the Southwest culture province, a somewhat lesser connection with trans-Sierran California, and a definite though weak connection with southern Oregon."

The significance of this conclusion is that it seems once more to indicate that a conception of a widespread low-level culture, geared entirely to the resources of the desert over much of the Great Basin, can be accepted as a reasonable working base for further analysis of Great Basin archaeology. In sum, this is a competent job of reporting, enlivened by some stimulating comparisons which will be of great use to both the general student and the specialist.

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Archeological Investigations in Iron County, Utah. CLEMENT W. MEIGHAN, NORMAN E. COLES, FRANK D. DAVIS, GERALDINE M. GREENWOOD, WILLIAM M. HARRISON, AND E. HEATH MACBAIN. University of Utah, Department of Anthropology, Anthropological Papers, No .25, University of Utah Press, Salt Lake City, 1956. viii+132 pp., 63 figs., 20 tables. $2.25.

In 1919 Neil Judd published the results of an archaeological investigation in the southern Utah Puebloid site of Paragonah. The volume under review is the result of a reexamination and excavation of part of that large site by an archaeological field school party from the University of California at Los Angeles, directed by Clement W. Meighan, with the excavation, laboratory work, and writing being the combined efforts of Meighan and his students.

Student-written descriptive chapters make up the largest part of the report. The 2 rubble-covered adobe structures and 2 pit houses are well described with good artifact and architectural detail and, for the most part, lucid explanation of the work done. The petroglyphs of the region are fully covered and judged to be Puebloid, not Shoshoean as Judd had hypothesized. A final chapter reports on the 2 burials found in the course of the digging. Unfortunately, except for the statement that "no deviance in physical type from what Seltzer has referred to as the Southwest Plateau stock may be concluded from our measurements," there is no detailed comparison between this small but important population and other Southwest series, although the problem of the physical affiliations of the Puebloid peoples is certainly one of the most intriguing and crucial in the region.

In the first chapter Meighan summarizes and discusses the material described in the rest of the volume, while also making some observations on the rest of the site, which has now been all but destroyed. He suggests, for example, that the site may have had a population of 250, but realizes the many gaps in his informed guess, not the least being the lack of good information on dating and the weak basis for judging the number of occupants of each structure. He also discusses the possible reasons why the site was abandoned, and again, on admittedly meager evidence, suggests drought. As for the origin of the site, he hypothesizes migration from the Pueblo area, rather than diffusion of Anasazi traits resulting in a change of an older Basin culture.

The work is an excellent product of a summer field school and the individuals involved are to be congratulated on their speed of publication. However, the volume is not without a few minor defects, such as the lack of a general location map, site drawings of varying quality with inconsistent technique from chapter to chapter, and the presence of a certain amount of unnecessary duplication, especially in the repetition of ecological information which could profitably have been included in one section and treated in more detail.

This volume is a valuable addition to the University of Utah's highly readable and excellently conceived series of reports on Utah anthropology.

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Diego de Landa: Soobshchenie o delakh v Iukatani, 1566 [*Relación de las Cosas de Yucatán*]. A translation from the Spanish with introduction and notes. Y. V. KNOROSOV. Akademia Nauk SSSR, Moscow, 1955. xviii+273 pp., 5 figs., 32 pls., 18 illustrations, 4 tables, map.

This Russian translation of the most valuable single work on the Maya was made from the Spanish edition of Genet and from the Documentos Ineditos (Madrid 1900) and then compared for accuracy with the translations published by Genet, Gates, and Tozzer. Knorosov's rendition appears to be quite precise, and his notes are to a large extent based on those of Tozzer.

It is the critical introduction (pp. 3-96), entitled "Diego de Landa's Relación as a Historical and Ethnographic Source," that is of most interest in this new work. For decades almost all inquiry into the culture of the Maya has been carried out by scholars of the western world — American, Mexican, western European — engaged in what most of them have believed to be inductive, empirical research. Knorosov believes otherwise. He not only attacks Mayanists for their lack of theoretical content (a position, after all, adopted also by Kluckhohn and Taylor), but feels that their work has been made useless by what he terms "bourgeois idealism."

Although Morley and J. E. S. Thompson are throughout Knorosov's main targets ("the interpretations of the sources by American scientists, especially Morley . . . are even more opinionated than the sources themselves," p. 93), his scheme of Maya history largely follows Morley's outdated "Old Empire"-"New Empire" sequence. His Yucatecan sequence is that of Thompson, and the Goodman-Martinez-Thompson correlation is wholeheartedly accepted. Data on languages and present-day populations are from the first edition of Morley's *Ancient Maya*. In fact, his conclusions from the historical and archaeological data differ in no important respect from those of the leading Maya scholars of today. One wonders what all the fuss is about.

As might be expected, Knorosov has tried to fit the Maya into one of the evolutionary stages outlined by Engels and Marx, but concludes that, "the data for such a scheme [of Maya history] are insufficient" (p. 23). On the basis of statements in Landa, Knorosov holds that the Maya had emerged from a clan to a class society. Material culture is barely mentioned, however, for the civilized, slave-holding Maya had one of the poorest technologies known to archaeology, a glaring exception to the Marxist dictum that social structure and developmental stages are a function of the economy and ultimately of the tools used. Maya religion is interpreted as "a mighty weapon of class dominance" (p. 54). The calendar, according to Knorosov, was not the invention of the priests or any "great man," but reflects ancient social structure (an interesting overlap of Marxist and French sociology); accordingly, he argues that the "Four-year Cycle" proves that there was once a clan society among the Maya, the leadership of which revolved among 4 clans in turn (p. 73).

When he treats of Maya writing, he is on firmer ground. Knorosov is a theoretician of writing systems and, with his colleagues in the U.S.S.R., has made important contributions to the decipherment of the Easter Island tablets. Since 1950 he has published a series of studies on the glyphs which have shown him to be a figure to be reckoned with in Maya epigraphy. In brief, Knorosov feels that this script represents a truly hieroglyphic system, in many respects like Chinese and ancient Egyptian, and which cannot be said to be either wholly phonetic (as claimed by Whorf) or wholly ideographic, but which includes both these and other principles.

Consequently, the famous Landa "alphabet" may well be the most important key to the writing. To Knorosov, "the whole history of the decipherment of Maya writing is a brilliant example of the helplessness of contemporary bourgeois science" (p. 76), beginning with Seler and including above all Morley and Thompson, who are accused of considering the calendar as the key to the script. Their attempts at decipherment, he says, resemble those of the 17th century German eccentric Athanasius Kircher, who made a feeble try at the Egyptian hieroglyphs using similar methods. "Among the important Maya scholars, only Tozzer has correctly considered the question of the character of Maya writing as far from settled" (p. 77).

The last ten pages of the introduction bring the reader up to date on history in the Maya area since Landa. This is a tiresome piece of anti-American propaganda. One can only wonder that it was prepared for inclusion in a book of supposedly scientific interest.

Although his bibliography is large and well-selected, he has included a commentary that is astonishing. Western archaeologists are portrayed as having been at first under the influence of the Kulturkreise school, but finding this insufficiently reactionary, they have become "super-reactionaries." Studies of the Maya by American scholars are superficial and sensational, according to Knorosov. Finally, "In the last few years it has been characteristic for U.S. scientists to try to prove that the civilization of the ancient Maya was the highest in the world, while at the same time they attempt to dissociate ancient Maya culture from the present-day Maya, who are considered incapable of high culture" (p. 249).

Stripped of the propaganda, unfortunately necessary under the present regime, this is basically a sound and scholarly work. Knorosov, so far removed from first-hand knowledge of either the area or the documents, must be commended for bringing to the Russian-speaking world an extensive summary of what is known of this important civilization. One can only hope that he and his colleagues will be as successful with the Maya script as they have been with that of Easter Island.

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CORRECTION

In "Uses of Aerial Photographs in Archaeological Field Work," by William C. Miller (AM. ANTIQ., Vol. 23, No. 1, pp. 46-62), the United States Forest Service was incorrectly listed under the Department of the Interior; it is a unit of the Department of Agriculture. In addition, the Editor has been advised that the Department of Agriculture's Technical Advisory Board has been discontinued, and its functions transferred to the Performance Division of the Commodity Stabilization Service, U.S. Department of Agriculture. However, inquiries concerning the availability of aerial photographs held by the Department of Agriculture should be directed to the office having custody of the film, as shown on an index sheet obtainable from the Forest Service, U.S. Department of Agriculture, Washington 25, D.C.

ANNUAL MEETING OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY, 1957

The 22nd Annual Meeting of the Society for American Archaeology was held on Thursday, Friday, and Saturday, May 2, 3, and 4, 1957, at the University of Wisconsin and the Wisconsin State Historical Society, Madison, Wisconsin, in conjunction with the Annual Meeting of the Central States Anthropological Society. Total registration at the meeting was 287, but this did not represent the total membership in attendance or the number of persons at various sessions.

Meeting of the Executive Committee

As required by Article VI, Section 3, of the Society's Constitution, the annual meeting of the Executive Committee was held prior to the annual business meeting of the Society. An account of this meeting is included in the report of the Secretary.

Annual Business Meeting

The annual business meeting was called to order by President William A. Ritchie at 4:15 p.m. on Friday, May 3, 1957. About 70 members were present.

The minutes of the 21st Annual Meeting were approved as published in American Antiquity, Volume 22, Number 2, pp. 212-6 (October, 1956).

The report of the Treasurer (printed below) was read and accepted by the membership on the recommendation of the Auditing Committee (Frank Ridley, William E. Renison).

The report of the Editor (printed below) was read and accepted by the membership.

The report of the Secretary (printed below) was read and accepted by the membership.

The report of the Elections Committee (David A. Baerreis, William S. Laughlin, Warren L. Wittry) was included in the Seceretary's report. The result of the mail ballot (426 ballots received) was:

President: George I. Quimby
First Vice-President: Alex D. Krieger
Second Vice-President: Kenneth E. Kidd
Treasurer: James L. Swauger
Members of the Executive Committee (to 1959): Robert E. Bell, Clarence H. Webb.

New Business

Douglas S. Byers presented the report (printed below) of the Committee on Professional-Amateur Relations, which was discussed and accepted by the Society. President Ritchie summarized a report of the Highway Archaeological Salvage Committee, which was transmitted by its chairman, Fred Wendorf.

The following resolutions were presented by the Committee on Resolutions (W. C. McKern, William S. Laughlin) and accepted by the membership:

Resolved: That the Society for American Archaeology expresses its keen appreciation of the Exhibition of Hopewell Art and Archaeology to the sponsors and contributors, institutional and individual, and to the personnel of the Madison Art Association, Department of Sociology and Anthropology, and State Historical Society responsible for assembling and displaying the collections.

Resolved: That the Society for American Archaeology expresses its thanks to the University of Wisconsin, The State Historical Society of Wisconsin, and the Department of Sociology and Anthropology for the hospitable reception accorded the Society.

Resolved: That the Society for American Archaeology expresses its thanks to Robert Wauchope for the instrumental part he played in preparing the Summer Seminars in Archaeology in 1955, including the organizing, securing of funds, and editing, ably documented in Memoir No. 11.

Resolved: That the Society for American Archaeology assembled at its 22nd Annual Meeting expresses its deep sense of loss in the deaths of J. K. Hampson, F. W. Hodge, J. A. Moller, Earl H. Morris, Harry Tschopik, Jr., Arthur D. Tushingham, and Paul W. Weer, and extends its sympathy to their families.

The annual business meeting adjourned at 5:30 p.m.

Annual Dinner

The annual dinner was held on May 3 at 7:00 p.m. at the Park Hotel, Madison, in conjunction with the annual dinner of the Central States Anthropological Society.

Other Sessions

Thursday, May 2, afternoon. William S. Godfrey, Jr., Chairman.

1. Ralph A. Luebben, Laurence Herold, and Arthur Rhon: "Site 52 in the Mesa Verde."
2. Douglas W. Schwartz: "Population and Habitation Changes in the Southern Grand Canyon Region."
3. William A. Ritchie: "The Paleo-Indian in the Northeast."
4. Douglas S. Byers: "A Re-examination of the Sequence at Ellsworth Falls, Maine."
5. Alex D. Krieger: "Definitions of Pleistocene, Early Man, Recent Archaic, Etc."
6. Melvin L. Fowler: "Modoc Rock Shelter."

Thursday, May 2, evening *Session* A. John B. Rinaldo, Chairman.

1. Carl B. Compton: "The Distribution of Certain Precolumbian Forms and Motifs."
2. J. Eric Thompson: "Divinatory Almanacs and Hieroglyphs for Diseases in the Maya Codices: A New Discovery."
3. J. Charles Kelley: "Excavation and Reconnaissance in Durango, Mexico."

Thursday, May 2, evening, *Session* B (in conjunction with the Central States Anthropological Society). Paul Fejos, Chairman.

"The Use of Motion Pictures in Anthropological Research and Training." Participants: Glenn Black, John Mc.Gregor, Robert Ritzenthaler, Theodore Schwarz, Richard Williams.

Friday, May 3, morning *Session* A. James B. Griffin, Chairman.

1. An Informal Discussion of Problems Related to Oneota.

2. Stephen Williams: "Scarifiers in the Southeast: An Archaeological Identification."

3. Fred P. Thieme: "Radiometric Assay of Archaeological Materials."

4. E. Mott Davis: "Brown VIII, a Burial Site on the Eastern Gulf Coast of Texas."

5. Edward B. Jelks: "Salvage Archeology at McGee Bend Reservoir Texas."

6. Theodore L. Stoddard: "An Application of the Robinson-Brainerd Method of Chronological Ordering to the Archaeology of Maine."

Friday, May 3, morning, *Session B.* (in conjunction with the Central States Anthropological Society). Elman R. Service, Chairman — South American Culture History.

1. Donald W. Lathrap: "The Cultural Sequence at Yarinacocha in Eastern Peru."

2. Donald Collier: "Pottery Molding and Stamping on the North Coast of Peru: The Relative Persistence of Two Technological Traditions."

3. Gertrude E. Dole: "Outline of the Prehistory of the Upper Xingu Basin."

4. Wesley R. Hurt: "The 1956 Excavations in the Lagoa Santa Region, Brazil."

5. Robert Carneiro: "Tropical Forest Culture History: An Attempted Reconstruction."

Friday, May 3, afternoon, *Session A.* George I. Quimby, Chairman.

1. Douglas Osborne: "Western American Prehistory — An Hypothesis."

2. Richard D. Daugherty: "An Archaeological Survey of the Upper Peace River, British Columbia."

3. T. P. Bank II: "Cultural Succession in the Aleutians, II."

4. Carolyn M. Osborne: "The Knight Island Blanket: Analysis and Significance."

5. A. R. Kelley and D. W. Chase: "Halloca Creek, a Stratified Early Woodland Site in West Georgia."

6. John M. Goggin: "The Archeological Study of Spanish Colonial Artifacts."

Friday, May 3, afternoon, *Session B.* (In conjunction with the Central States Anthropological Society). Andrew H. Whiteford, Chairman — Seminar on the Teaching of Anthropology.

1. John Mc.Gregor: "The Introductory Course."

2. Chandler W. Rowe: "Anthropology in the Liberal Arts College."

3. John C. Messenger, Jr.: "Anthropology in the General Education Program."

4. William Bascom: "Anthropology in the Interdisciplinary Program."

5. Richard K. Beardsley: "Anthropology in Area Study Programs."

6. Sol Tax: "Preparation for Graduate School."

Saturday, May 4, morning. Carlyle S. Smith, Chairman.

1. W. H. Sears: "Burial Mounds on the Gulf Coastal Plain."

2. Robert E. Greengo: "Culture Sequence in the Yazoo Basin, Mississippi."

3. Reynold J. Ruppé: "The Hopewell Complex in Iowa."

4. John C. Mc.Gregor: "A Hopewell Village Near Hull, Illinois."

5. Raymond S. Baby: "Excavation of a Hopewellian Mound near Frankfort, Ohio."

6. Edward V. McMichael: "The Newton Focus of Southwestern Ohio."

8. William S. Laughlin: "Practical and Methodological Problems in the Racial History of the American Indian."

9. William E. Edwards: "The Aboriginal Peopling of the New World."

Report of the Secretary

Committees. The following regular committees were appointed by President William A. Ritchie and approved or elected by the Executive Committee as required by the Constitution and By-Laws of the Society.

Nominating Committee: Douglas Osborne, Chairman; John Longyear III; and Terah L. Smiley.

Viking Fund Award Committee: Erik K. Reed, Chairman, Alfonso Caso; John L. Champe; Donald Collier; Emil W. Haury; Kenneth E. Kidd; Alfred Kidder II; Richard S. MacNeish; W. C. McKern; F. H. H. Roberts, Jr.; W. Duncan Strong; J. E. S. Thompson; Gordon R. Willey.

Program Committee: David A. Baerreis (Co-chairman, for Society for American Archaeology); Andrew H. Whiteford (Co-chairman, for Central States Anthropological Society); C. W. M. Hart (for Society for Applied Anthropology); Robert E .Ritzenthalter; Milton L. Barnett.

Local Arrangements Committee: William S. Laughlin, Chairman; Warren L. Wittry; Robert Carneiro.

Auditing Committee: Frank Ridley, Chairman; William E. Renison.

Elections Committee: David A. Baerreis, Chairman; William S. Laughlin; Warren L. Wittry.

Resolutions Committee: W. C. McKern, Chairman; William S. Laughlin.

A special *Committee on Professional-Amateur Relations* was appointed by President Ritchie, in accordance with the motion passed at the 21st Annual Meeting of the Society, consisting of: Douglas S. Byers, Chairman; Carl H. Chapman; Henry W. Hamilton; Alex D. Krieger; P. Schuyler Miller; Arthur G. Smith.

Junius B. Bird was chosen by the Viking Fund Award Committee as the 1956 medalist.

The Nominating Committee presented the following names for the 1957 election of officers: for President — John M. Corbett, George Quimby, H. M. Wormington; for First Vice-President — Charles C. Di Peso, Alex D. Krieger, Robert H. Lister; for Second Vice-President — Luis Aveleyra Arroyo de Anda, Heinrich Berlin, Kenneth E. Kidd; for Treasurer — James L. Swauger; for First Executive Committee member (to 1959) — Robert E. Bell, Franklin Fenenga, John H. Rowe; for Second Executive Committee member (to 1959) — Stephan F. Borhegyi, Deric O'Bryan, Clarence H. Webb.

The Executive Committee held a special meeting at Lincoln, Nebraska, on May 4, 1956, and its regular annual meeting in Madison on May 2, 1957. Its actions during the fiscal year (other than approval of the appointments noted above) included an increase in dues for individuals and institutions to $8.00 as of May 1, 1957, acceptance of the University of Oklahoma to hold the 1958 annual

meeting at Norman, approval of the dates May 1-3 for the 1958 annual meeting, approval of the Editor's, Treasurer's, and Secretary's reports for 1956-57, and approval of the proposed budget for 1957-58 prepared by the Treasurer. In the consideration of the Treasurer's report, the Executive Committee approved the doubling of illustrations in AMERICAN ANTIQUITY allowed without charges to the authors.

At the 1956 annual meeting, the Executive Committee was requested to consider the establishment of a Society for American Archaeology newsletter to serve as an amplification of the "Notes and News" section of AMERICAN ANTIQUITY. This question was considered at length through correspondence during the course of the year and further discussion at the May 2 meeting. The lack of funds for such an enterprise coupled with the unavailability of a suitable editor made it, in the opinion of the Executive Committee, not feasible at the present time. It was thought the membership should be encouraged to make further use of existing facilities, such as the "Notes and News" section and local journals now available. Further, a clear indication of suitable content of permanent value as well as a general need for such a publication could not be discovered. The various subjects currently suggested appeared adequately covered by present outlets.

Douglas Byers, as Chairman of the Committee on Professional-Amateur Relations, reported to the Executive Committee on its work. The report was accepted by the Executive Committee with an expression of gratitude for the work of the committee. It was recommended that the incoming President consider the continuation of the study.

The Executive Committee also approved a motion to the effect that it was not in a position to take action in regard to a petition circulated by Chester Chard. In regard to the work of the Highway Archaeological Salvage Committee it was recommended that the National Research Council be asked to form a Committee covering the fields of Anthropology, Paleontology, Engineering, and History, with selected members of the Society for American Archaeology Committee to meet and explore the possibilities for organizing and financing the highway salvage program. The committee members recommended were Fred Wendorf, Chairman; Irving Rouse; John Mc. Gregor; and the President of the Society for American Archaeology. The sum of $50 was allocated for the Salvage Committee expenses.

The Secretary's office conducted the usual correspondence relating to applications for membership and other matters. All constitutional requirements with regard to the nominating committee, announcements of meeting and call for papers, and elections were fulfilled. During the fiscal year, as the result of an anonymous gift of $650 from a member of the Society for this purpose, 2 quarter-page advertisements were placed in the *Scientific American*. The results of this are reflected in the substantial increase in membership reported by the Treasurer.

President Ritchie, on behalf of the Society, prepared a letter of tribute to A. E. Douglas for his contributions to the field of archaeology on the occasion honoring his work at the 1956 annual meeting of the American Anthropological Association at Santa Monica.

Respectfully submitted,
DAVID A. BAERREIS, *Secretary*

REPORT OF THE TREASURER

General. The coordination of activities between the office of Treasurer and the Executive Secretary of the American Anthropological Association continues successful, and plans have now been made to transfer complete billing responsibility to the Executive Secretary's office.

Finances. At the direction of the Executive Committee, the Treasurer instituted this year the practice of transferring all income from sales of back issues into the Publication Fund. This procedure will enable the Society to make more effective use of this portion of its income.

Our main source of income continues to be dues from membership, with charges to authors remaining a minor but significant contributing factor. Fiscal 1956-1957 was the Society's biggest year for subsidies. In addition to those subsidies listed in the financial statement, almost the entire cost of Memoir 11 was subsidized; this was financed and printed externally and thus does not show on our records.

Actual income and expenditure were not greatly different from budgeted amounts.

Membership. Our trend of gradually increasing membership continued this year. The following totals are reported as of April 15, 1957:

Individual	1079
Life	11
Institutional	298
TOTAL	1388

Budget. The budget proposed for 1957-1958 has been set up in 2 parts, in order to more readily show our Memoir financing program in relation to the Publication Fund. The increase in dues (estimated on the basis of 1300 members) should offset the transfer of sales income to Memoir publication as well as provide funds to meet increasing printing costs and a more appropriate editor's office budget. The increase in the charge for collection of dues reflects a more realistic share of the cost to the American Anthropological Association in providing such services.

FINANCIAL STATEMENT

MAY 1, 1956 THROUGH APRIL 30, 1957

A. WORKING FUND

1. *Receipts*

a. Balance forward May 1, 1956		$2,640.13
b. Dues received		8,310.42
c. Chargers to authors for reprints		746.79
d. Charges to authors, excess engravings		345.00
e. Subsidy (Memoir 12)		2,212.50
f. Subsidy (article)		65.00
g. Subsidy (for advertising in *Scientific American*)		650.00
Total		$14,969.84

2. *Expenditures*

a. Printing American Antiquity (4 issues)	$6,563.79	
b. Distributing American Antiquity	492.87	
c. Printing Memoir 12	1,976.05	
d. Distributing Memoir 12	97.20	
e. Preparing Memoir 12	208.00	
f. Binding Memoir 11	310.00	
g. Printing authors' reprints	905.65	
h. Editorial Assistant (3 issues)	600.00	
i. Editor's office expense	292.25	
j. Associate Editors' office expense	25.00	
k. Treasurer's office expense	88.84	
l. Charge for collection of dues at $0.25 each	342.00	
m. Annual meeting, 1956	131.15	
n. Annual meeting, 1957	121.05	
o. Contribution, Douglass tribute	3.30	
p. Refund	6.00	
q. Advertising *Scientific American*	643.50	
Total		$12,806.65

3. *Cash Balance*, May 1, 1957		$ 2,163.19
4. *Outstanding*, May 1, 1957		
a. Accounts payable	$ 200.00	
		200.00
5. *Total Assets, Working Fund*		$ 1,963.19

B. PERMANENT FUND

1. Total on hand, April 30, 1956	$ 671.72
2. Interest	11.78
3. Total on hand, April 30, 1957	$ 683.50

C. PUBLICATION FUND

1. Total on hand, April 30, 1956	$ 3,930.43
2. Interest	44.38
3. Sale of back issues, American Antiquity	$ 652.69
4. Sale of Memoirs	203.52
5. Total on hand, April 30, 1957	$ 4,831.02

BUDGET FOR 1957-1958

WORKING FUND

Receipts

a. Balance brought forward		$ 2,000.00
b. Dues for 1957-58		10,400.00
c. Charges to authors for reprints		750.00
d. Charge to authors for engravings		350.00
Total Receipts		$13,500.00

Expenditures

a. Printing American Antiquity	$ 7,000.00	
b. Distributing American Antiquity	500.00	
c. Printing authors' reprints	1,000.00	
d. Editorial Assistant	800.00	
e. Editor's office expenses	500.00	
f. Associate editors' office expense	75.00	
g. President's office expense	100.00	
h. Secretary's office expense	100.00	
i. Treasurer's office expense	100.00	
j. Charge for collection of dues at $0.50 each	650.00	
k. Annual meeting	150.00	
l. Subsistence at annual meeting (Pres., Sec., Treas., Ed., if necessary)	100.00	
m. Balance forward, May 1, 1958	2,425.00	
Total Expenditures		$13,500.00

PUBLICATION FUND

Receipts

a. Balance brought forward		$ 4,831.02
b. Sale of back issues		600.00
c. Sale of Memoirs		200.00
d. Subsidy for Memoir 13		850.00
Total Receipts		$ 6,481.02

Expenditures

a. Memoir 13		$ 1,150.00
b. Memoir 14		800.00
c. Memoir 15		1,600.00
d. Memoir 16		600.00
e. Memoir 17		600.00
f. Balance forward, May 1, 1958	1,731.02	
Total Expenditures		$ 6,481.02

Respectfully submitted,

WILLIAM J. MAYER-OAKES, *Treasurer*

REPORT OF THE EDITOR

Volume 22 of AMERICAN ANTIQUITY, published during 1956-1957, comprised 452 pages, and included 24 major articles, 5 obituaries, 37 Facts and Comments articles, 60 Reviews, the usual announcements, the report of the Annual Meeting, 50 pages of Notes and News, and 9 pages listing Some Recent Publications. During this period 86 manuscripts were received, of which 70 were accepted (1 subsequently withdrawn) and 16 rejected. A reduction in the backlog of unpublished manuscripts has shortened somewhat the time between receipt and publication; for the present issue major articles average 10 months and short articles 9 months.

In addition, during 1956-1957, Memoirs 11, 12, and 13, totaling 296 pages, were published and distributed at no extra charge to the membership. Generous financial assistance from the Carnegie Corporation of New York, from Rand McNally and Company, and from the Columbia University Council for Research in the Social Sciences made these memoirs possible and made it necessary for the Society to add only a small additional amount from its resources.

Because of its exceptional importance and the scope of its contents, copies of Memoir 11, *Seminar in Archaeology: 1955*, were sent with the compliments of the Society to about 150 prominent foreign archaeologists, many of whom do not regularly or promptly see our publications.

As in previous years, AMERICAN ANTIQUITY has used virtually the entire income of the Society. In addition, we find it necessary to charge authors for the full cost of reprints and to charge authors for a considerable part of

the cost of illustrations. One of the editor's recommendations to the treasurer this year is that in the near future part of our increased income from higher dues go toward reducing somewhat these charges to authors.

* * *

From April, 1954, to mid-March, 1957, nonprofessionals sent in 15 of the 101 manuscripts of article length that were received by the editor for consideration, and of these 15, 11 (74%) were accepted for publication. Professionals in this same period sent in 86 article-length manuscripts, and 68 (79%) of these were accepted.

Of the manuscripts submitted for Facts and Comments in this period, nonprofessionals contributed a large part of the total, 28% of the 156 received. But a somewhat smaller proportion of their submitted manuscripts (61%) were accepted. In comparison, professionals sent in 113 manuscripts for Facts and Comments, of which 73% were accepted.

Looked at another way, 14% of the major articles accepted in the last 3 years were by nonprofessionals, and 21% of the Facts and Comments articles. Although they sent in far fewer manuscripts than did the professional contributors, the rate of acceptance was not greatly different for the 2 groups. Our nonprofessional contributors thus have a creditable record on quality, and one of which they should be proud. It should be realized that their manuscripts were accepted entirely for their merit and interest, after evaluation by the same standards that are applied to the manuscripts submitted by professionals. In terms of quantity, the contribution of nonprofessionals is disappointing, in view of their numbers and the importance of their activities. While not neglecting the journals of their local societies, they owe it to their colleagues, whether professional or not, to make some of their more important conclusions and ideas available to the international audience that AMERICAN ANTIQUITY reaches.

It is of interest that of 2 memoir manuscripts recently accepted contingent on the securing of funds for publication, one is by a nonprofessional.

* * *

One of the constant problems of a journal editor is the need to preserve a balance among the various topics that may properly be included, while not thwarting shifts in interest or the development of new emphases. A comparison of the number of major articles devoted to various subjects for Volumes 10, 11, and 12 (with a total of 70 articles) and Volumes 20, 21, and 22 (66 articles — some of them unusually long) reveals the following differences (expressed in percentage of articles):

	Volumes 10-12	*Volumes 20-22*
Method and theory	11%	14%
Comparative	1	3
Historic	0	3
Early Man	3	6
Physical Anthropology	1	0
Areas:		
Asia and Pacific	3%	6%
Arctic	4	6
Pacific Coast-Great Basin	7	12
Southwest	16	8
Plains	1	0
Northern Miss. Valley	11	6
Northeast	9	2
Southeast	10	3
Middle America	14	11
Caribbean	1	6
Highland South America	6	8
Lowland South America	0	8

In nearly all instances the number of Facts and Comments articles shows a similar trend.

Respectfully submitted,
RICHARD B. WOODBURY, *Editor*

REPORT OF THE COMMITTEE ON PROFESSIONAL-AMATEUR RELATIONS, *Appointed to Study Problems of Affiliating State and Local Societies with the S.A.A.*

In order to explore the possibilities of effecting closer affiliation with state and local societies, President Ritchie appointed a committee of six, including Carl Chapman, Alex D. Krieger, Arthur George Smith, Henry W. Hamilton, P. Schuyler Miller, and Douglas S. Byers, Chairman. Sherman P. Lawton and Charlie R. Steen were asked by the Chairman to join the Committee. After considerable correspondence the Committee developed a questionnaire and a covering letter which we sent out to presidents or responsible officers of state and local societies which carry on archaeological works. For names and addresses, the Committee are indebted to our colleagues who replied to a cry for help sent out by the Chairman.

The questionnaire was intended to test opinion regarding interest in affiliating state and local societies with the S.A.A. The covering letter was intended to explain to societies the purpose of the inquiry and the background of the movement. We sent out 206 questionnaires. Forty-one were returned: 14 were in favor; 15, opposed; 7, qualified no; 5 returned the questionnaires with the comment that the societies were not interested in archaeology or the person did not feel qualified to answer. Three of the 14 who were in favor attached some qualification to their endorsements.

The Committee detects a lack of enthusiasm for affiliation under present circumstances. It also notes that only one questionnaire made any suggestion of a basis for affiliation under conditions different from those set forth in Article IV, Section 1 of the By-laws.

The Committee feels that this provision in the By-laws is a deterent to closer affiliation of state and local societies with the S.A.A., and recommends its elimination or modification.

The Committee recognizes an obligation to work closely with all state and local groups which are receptive and to acquaint as many people as possible with the importance and scientific value of archaeological remains and the need for proper methods of excavation. Such a

course will not only tend to increase the chances of protecting and preserving some archaeological remains but also will gain wider public support for archaeological programs. It is felt that this is within the province of the state and local societies and that they must be encouraged in every way to pursue such a course. Coordination of such efforts falls within the province of the S.A.A.

The Committee feels that a mechanism for coordinating these efforts does not now exist. It recommends a continuation of the study of means of effecting coordination. Almost all questionnaires asked for circulation of some printed medium such as a newsletter, but the history of the *Notebook* and of the newsletters of some other societies does not augur well for such an undertaking. Such a newsletter could be shipped in bulk to societies and distributed by them to their members. Mechanism for compiling, printing, and financing such a medium does not now exist.

The Committee begs to be discharged and urges appointment of a new committee to continue the study.

Respectfully submitted,

DOUGLAS S. BYERS, *Chairman*
For the Committee

OFFICIAL NOTICE

As required by the By-Laws, Article II, Section 2, the names and addresses of the Nominating Committee for 1957-58 are listed herewith: Irving Rouse (Chairman), Department of Anthropology, Yale University, New Haven, Connecticut; James B. Griffin, Museum of Anthropology, University of Michigan, Ann Arbor, Michigan; and W. C. McKern, Public Museum, Milwaukee, Wisconsin.

The offices to be filled are President, 1st Vice President, 2nd Vice President, Editor, and 2 members of the Executive Committee. Members are reminded that they may suggest names for nomination, to the Nominating Committee, before December 1.

NOTES AND NEWS

EDITED BY CLEMENT W. MEIGHAN

GREAT BASIN AND PACIFIC COAST

MONTANA. A Montana State University crew, under the direction of Carling Malouf, excavated this past summer at historic Fort Owen, now a Montana State Monument. The group traced the fort's foundations and located a cache of metal goods, mostly wagon parts and horse gear, under one of the bastions. Interior details, such as rooms, will be explored next year.

BRITISH COLUMBIA. With financial assistance from the University of British Columbia Committee on Research, and assisted by members of the University's Archaeology Club, a group of anthropology students under the direction of Charles Borden excavated at a large shell-mound near Beach Grove in the southwestern part of the Fraser delta. Zoomorphic stone vessels, harpoon types, and other traits suggest a cultural and temporal relationship with the famous Marpole site at the northern edge of the delta. Unfortuately, this latter site is now nearly completely built over. Nevertheless, it is hoped that later excavations will uncover more of what appears to be the remains of a large plank house, part of which was exposed near the western extremity of the site during the 1955 excavations.

Borden and W. Matthews plan to study the geological history of the ancient site on the east bank of the Fraser north of Yale, the discovery of which was reported in "Notes and News" in January, 1957.

OREGON. The Klamath County Museum conducted a teaching excavation for the benefit of local nonprofessionals during July. The site excavated was formerly an island in Lower Klamath Lake and was chosen as a salvage project because of the extensive damage being done by relic hunters.

Paul Schumacher, National Park Service Archaeologist, spent 2 weeks during April continuing excavations at Fort Clasop near Astoria, Oregon. Although unsuccessful in locating the actual remains of the Old Lewis and Clark fort, he found several fire pits which may mark the locations of expedition fires during the building of the fort in December, 1805.

WASHINGTON. Crews from the University of Washington excavated in the Priest Rapids reservoir area under the direction of Robert Greengo. A large number of sites will be inundated with the completion of the Priest Rapids Dam.

A State College of Washington crew, under the direction of Richard Daugherty, excavated 2 large house pits and trenched through the deep, stratified deposits of a large site located at the upper end of the Ice Harbor Reservoir on the Snake River. In addition, 2 smaller sites at the lower end of the reservoir were tested. A contract between the State College of Washington and the State of Washington Department of Conservation and Development, Division of Mines and Geology, establishes a 3-phase archaeological program for the year starting July, 1957. Allan Smith surveyed sites in the Kalispell area of northeastern Washington during August; Earl Swanson, with matching funds from the State Parks and Recreation Commission, excavated in the Fort Okanogan area during July and August; Bruce Stallard began a year-long program of highway salvage archaeology in July.

CALIFORNIA. A second contract has been negotiated between the University of Southern California and the California State Division of Beaches and Parks for work at the Hugo Reid adobe in Arcadia, built in 1840. The first phase of the work, locating foundations and room divisions, inside the walls has been completed. During this past summer a crew of 4 students, under the direction of William Wallace, excavated around the adobe in search of auxiliary structures and outbuildings such as outdoor ovens and possible servant (Indian) quarters.

The Southwest Museum is celebrating its 50th anniversary by continuing to renovate its building and exhibits. Charles Rozaire and Ruth Simpson of the curatorial department worked in the field with other organizations: Rozaire with the New World Archaeological Foundation near Tuxtla, Mexico, and Simpson with the Santa Barbara Musem of Natural History-Nevada State Museum expedition in Nevada. During the early part of the summer Simpson continued her Manix Lake survey in the Mojave Desert. Paiute artifacts lie close to the modern lake bed, Playa Complex materials are found on the intermediate terraces, and crude biface, paleolithic-like implements occur on the highest terrace and on the hills flanking the lake shore. The heavy bifaces are found also on numerous sites in the adjacent Calico Hills.

The 8th Western Speleological Institute-Nevada State Museum Lake Lahontan Expedition, sponsored by the National Geographic Society and directed by Phil C. Orr and J. W. Calhoun, excavated several caves in the Winnemucca area. Mapping the area and the caves and establishing accurate elevations on radiocarbon-dated samples of tufa were done by Charles Taylor and Dave Christiansen. Wilbur "Buck" Davis and a crew of Paiute Indians excavated the caves. Radiocarbon dates on archaeological material extend from 1510 B.P. to 11,200 B.P. The dating of the history of Lake Lahontan has been carried out as a joint Western Speleological Institute-Lamont Geological Laboratory project, and has provided nearly 50 radiocarbon dates between 1100 B.P. and 32,000 B.P.

The 11th Santa Rosa Island Expedition of the Western Speleological Institute and Santa Barbara Museum of Natural History will go into the field about October 1, to search for evidence of the dwarf-mammoths hunters.

Sacramento State College conducted a field school in the Lake Tahoe area this past summer. Crews from Sacramento State College, under the direction of Reeve and Arnold, also worked at site Nap-98 under a contract with the National Park Service.

The University of California Archaeological Survey artist executed a full-scale color reproduction of 2 petro-

glyph groups soon to be inundated by the Terminus Reservoir Dam near Lemoncove. This work was performed for the Corps of Engineers under contract with the National Park Service.

Adan E. Treganza, San Francisco State College, as a collaborator with the University of California Archaeological Survey, and under contract with the National Park Service, excavated various sites on the Trinity River in areas which will be inundated by the construction of the Trinity and Lewiston dams.

HAWAII. The Bishop Museum has completed its basic studies on the ethnology, archaeology, botany, and other aspects of the City of Refuge National Historical Site.

Assembled by R. D. DAHGHERTY

SOUTHWEST

ARIZONA. The Museum of Northern Arizona, Flagstaff, engaged in a number of field projects during the summer. In June and July a joint archaeological-paleontological expedition worked in the Shonto district of the Navaho Indian Reservation, where late Pleistocene fauna was washing out of a 60-foot bank in Shonto Creek. Several projects, described below, were completed in the Upper Colorado River salvage program.

At Pueblo Grande, Phoenix, Odd Halseth has completed the excavation of the ball court and is stabilizing it for preservation as an outdoor exhibit in the 6-acre tract set aside as a museum area. Other features of the Hohokam village are receiving the same treatment.

The National Park Service excavated and stabilized a small portion of the Puerco ruin in Petrified Forest National Monument.

During the second week of June, William W. Wasley, Archaeologist for the Arizona State Museum, undertook stabilization of the remaining walls of the Spanish Franciscan mission of Los Santos Angeles de Guevavi in the Santa Cruz valley 18 miles south of Tumacacori National Monument. The work involved spraying the walls with a waterproofing compound, backfilling large excavations made by treasure hunters, and banking fill around the base of the walls and providing drainage away from the walls. Financial assistance for the project was provided by Mrs. Ralph Wingfield, owner of the property; The Arizona Archaeological and Historical Society; The Pimeria Alta Historical Society; The Southwest Monuments Association; and the Arizona State Museum.

NEW MEXICO. At the Museum of New Mexico, Santa Fe, Bertha Dutton led the Senior Girl Scout Archaeological Camps during June and July. The Museum also cooperated in the Upper Colorado River program.

Charles Lange, Southern Illinois University, carried on 6 weeks of archaeological testing in the pueblo of Cochiti and in 2 nearby sites.

James Gunnerson, University of Utah, conducted a 6-week survey of northeastern New Mexico to locate sites, especially early historic sites, which would add to the information on Plains-Southwestern relationships and Athabascan movements.

UTAH. The summer field school of the University of California, Los Angeles, directed by H. B. Nicholson and D. M. Pendergast, spent its 4th season working in southern Utah at the Puebloid site of Paragonah.

COLORADO. Herbert Dick, Trinidad State Junior College, directed a field school, digging in the vicinity of Trinidad.

Don Watson, for many years Park Archeologist at Mesa Verde National Park, resigned from the Park Service in April and will be replaced by Carroll Burroughs. Watson plans to open a trading post near Cortez, Colorado.

UPPER COLORADO RIVER PROJECT. In cooperation with the National Park Service, several institutions were active in salvage archaeology programs along the Upper Colorado River and its tributaries.

H. E. Dittert, Museum of New Mexico, worked on Rosa phase and late Pueblo sites in the immediate area of Navaho Dam, and surveyed sections of the San Juan and Pine rivers.

The Museum of Northern Arizona surveyed the Colorado River bottom from Hite to the Glen Canyon dam site and also the southern tributaries of the Colorado. Gene Foster, Katherine Bartlett, David Brugge, and X. M. Gaines directed the research. William Miller, Helmut Abt, and David Breternitz surveyed Navaho Canyon and reported that most of the surface sites had been washed away.

The University of Utah began its part of the salvage program in the northern tributaries of the Colorado River in Arizona and Utah. Robert Lister, University of Colorado, was in charge of the first party to go into the area.

Asembled by ROBERT H. LISTER

PLAINS

The 15th Plains Conference will be held at the Laboratory of Anthropology at the University of Nebraska in Lincoln on November 28-30. Wesley R. Hurt, Chairman, reports that the Conference will be a joint one with the American Indian Ethnohistoric Conference. Archaeological meetings will include sessions on the archaeology and ethnology of the Arikara, on individual Plains area culture units, and on historic sites archaeology.

ALBERTA. Richard G. Forbis, of the Glenbow Foundation at Calgary, reports that the summer was spent recording collections and doing limited testing of sites in Alberta. Forbis was assisted by Timothy O'Leary, of Columbia University.

SASKATCHEWAN. W. J. Mayer-Oakes has been engaged by the Saskatchewan Museum of Natural History to do reservoir salvage archaeology in southeastern Saskatchewan. Robert W. Nero plans to test a site near Moose Jaw where lanceolate points with basal grinding have been found.

MONTANA. Verne Dusenberry of Montana State College at Bozeman is doing archaeological work in tipi ring sites and rock outlines — attributed to early historic

Blackfoot — in the valley of the 3 forks of the Missouri. At Montana State University in Missoula, Dee C. Taylor has joined the teaching staff to take over archaeological teaching and research from Carling Malouf, who plans to devote himself to ethnology henceforth. Thomas F. Kehoe, of the Museum of the Plains Indian at Browning, reports the completion of the Plains Prehistory Hall in the Museum, the only one of its kind in the state. Kehoe has just completed a definitive study of tipi rings in north-central Montana.

South Dakota. Oscar Howe joined the staff of the Museum of the University of South Dakota as Assistant Director in this fall.

Assembled by E. Mott Davis

NORTHEAST

Delaware. The excavation of the Mispillion site near Milford, Sussex County, has been completed and a report prepared The excavations were conducted during 1955 and 1956 by the Sussex Society of Archaeology and History under the direction of a committee, Warren H. Callaway, David Marine, and Henry H. Hutchinson, chairman, who prepared the report.

The evidence indicates Middle Woodland, Late Woodland, and historic occupations. Fabric-impressed shell-tempered pottery and grit-tempered pottery were found and human and dog burials, refuse pits, and postmolds located.

New York. Richard L. McCarthy has been excavating a site in Niagara County which produces British and French material superimposed on early historic and earlier prehistoric refuse. This site may be the Neutral village of Onguiaahra mentioned by early missionaries in 1626 and 1640.

The Rochester Museum of Arts and Sciences had a small party in the field between May and August. Two sites were investigated. During May, The Frog Mound, a Hopewellian manifestation near Geneseo in Livingston County, was examined. Although the central portion of the mound had been removed by an unknown excavator many years ago, 4 burials were located and the mound structure studied. Some information as to the nature of the central burial was obtained. Among the artifacts were projectile points, copper beads, 2 steatite bowl fragments, and argillite blades. June and July were spent investigating an Owasco village area, the Morrow site, on the northeast shore of Honeoye Lake in Ontario County. The village is on low land, but contains refuse pits and at least one burial of the Owasco people. An historic Seneca grave was located within the Owasco area and several artifacts of the historic period were in the upper levels of the refuse.

The museum's party consisted of Marian E. White and Alfred K. Guthe. Robert Graham and Charles F. Wray assisted in the excavation of the Frog Mound. Several members of the Lewis H. Morgan Chapter, New York State Archaeological Association, assisted in excavating the Morrow site.

Pennsylvania. In April the North Museum of Franklin and Marshall College, the Pennsylvania State Museum, and members of local archaeological chapters in Lancaster, York, and Harrisburg cooperated in excavations at the Albert Ibaugh site (also recorded as the Eybaugh site). This is a Susquehannock cemetery in Washington Borough, Lancaster County. In a 25-foot square plot, 29 burials were located of which 26 were excavated, all of them flexed. European trade and native materials were found in all but 2 graves. The most unusual find was a coronet, or head-dress, of brass beads encircling the skull of an adult male. Two multiple burials were encountered.

The project was under the direction of Charles Holzinger of Franklin and Marshall College; Arthur Futer, President of the Conestoga Archaeological Chapter, Society for Pennsylvania Archaeology; and W. Fred Kinsey, Curator of Anthropology, Pennsylvania State Museum. The site was known from salvage work conducted by John Witthoft and Charles Holzinger in excavations begun by Ibaugh for the foundation of a new house. In terms of the glass bead sampling, early "blues and whites," "Roman," and small "star" beads, this site has been dated at about 1600 to 1625.

Assembled by A. K. Guthe

SOUTHEAST

Florida. The University of Florida summer school, under John M. Goggin, spent a third of its time on underwater archaeology in addition to more routine pursuits. The experience gained has enabled further refinement of skin-diving techniques for recovery of archaeological specimens and data.

Florida State University completed a semester of work on the Apalachee Fort-Mission of San Luis. Excavations continued in the south moat and southeast bastion. Additions to the collections included trunions, pins, spurs, and religious medallions.

Ripley P. Bullen of the Florida State Museum and Frederick W. Sleight of the Central Florida Museum returned in May to the Castle Windy site south of New Smyrna Beach. They completed stratigraphic testing and collected additional charcoal samples for radiocarbon dating. The work is being sponsored by the William L. Bryant Foundation of Springfield, Vermont.

Georgia. The University of Georgia Field School under A. R. Kelly returned to Etowah to uncover Etowah IV and Wilbanks period houses partially brought out last year. L. H. Larson, Jr., for the Georgia Historical Commission, worked across the plaza on the core of mound C. Under permits from the U.S. Corps of Engineers and the National Park Service, Kelly and David Chase dug during June and July on a stratified midden deposit at Halloca Creek, occupied successively from the Archaic through the Fort Walton-Lamar periods.

The Columbus Museum of Arts and Crafts spent a second season at the Ruud Plantation near Georgetown, Georgia, on the Chattahoochee River.

During May and June A. R. Kelly and students excavated in the peripheries of the Tugalo Mound. Six burials, including one burial of a medicine man with medicine bag and conch shell necklace, were tentatively assigned to the final Etowah occupation.

LOUISIANA. A Conference of Caddoan Archeologists, arranged by Edward B. Jelks, was held at the Louisiana State Exhibit Museum in Shreveport on April 13 and 14, 1956. C. H. Webb acted as Moderator, and E. Mott Davis was elected Secretary. Thirteen persons from Texas, Louisiana, and Oklahoma took part. The conference took the form of an informal round-table discussion. After an introductory discussion of the taxonomic framework used in the Caddoan area, 2 major topics were taken up: ceramic typology, and archaeological complexes marginal to the Caddoan area. Some time was also spent on the subject of protohistoric and historic Caddoan sites. Perhaps the major theme that developed during the conference was the feeling that the foci recognized for the Caddoan area are not discrete units but grade into one another in many respects. In the present state of knowledge they are the most useful formulations to work with, but some of them may well undergo appreciable revision in the future. Plans are being made to publish the proceedings, and to hold a Caddoan Conference each year.

TENNESSEE. T. M. N. Lewis reports that the Department of Conservation will appoint a Park Archaeologist, and that a recent bequest will be used to build a museum building on the University of Tennessee campus, work to start in 1958.

TEXAS. The River Basin Surveys office at Austin initiated excavations at McGee Bend Reservoir last fall, when a field party supervised by Edward B. Jelks and LeRoy Johnson, Jr., spent 3½ months excavating 2 major sites, Short and Walter Bell, and testing 3 minor ones, Powell, Dubois, and Print Bell. These sites are situated in the Angelina River area in extreme eastern Texas, near the southern periphery of the Caddoan area. The outstanding feature of the Short site was a circular mound approximately 100 feet in diameter and 7 feet high. Evidence of 3 burials, one of them a cremation, was found in the mound. Burial furniture included 2 boatstones, several large stemmed knives or spear points, quartz pendants, a copper reel-shaped ornament, and several copper bracelets. This material — surprisingly for East Texas — has a Hopewell-Adena appearance. Although the area around the mound was trenched extensively, no sign of a village was found.

The Walter Bell site represents a small village of people related to the Caddoan Fulton aspect. Several house patterns, burials, and rich midden deposits yielded data which promise to help correlate the Fulton aspect with the Galveston Bay focus centered in the coastal plain to the south.

Assembled by W. H. SEARS

MIDDLE AMERICA

TABASCO. Gordon Ekholm of the American Museum of Natural History returned in June from a second season at Comalcalco, Tabasco, where, for a little over 2 months, assisted by Charles Brush and Bernard Golden of Columbia University and by Victor Segovia of the School of Anthropology of Mexico, he continued his investigation of the site.

The work of clearing the palace structure, begun last season, was continued to provide a fairly complete record of the plan and construction of this important building. One interesting feature is a sanctuary within the palace with a portion of its vaulted roof preserved. This sanctuary is very similar to those that occur in the temples at Palenque and is one of the clearest of a number of indications that this building and much of the architecture at Comalcalco is closely allied with that of Palenque. Other work on the acropolis included the testing of another building that is either a small "palace" or a large "temple," having elements of both types of buildings, and the making of complete plans and sections of the 2 temples with previously opened tombs that are largely above ground. The slopes of the acropolis were also tested at several points, revealing a stairway and a section of the stucco-covered facing of the walls, in both cases with various superpositions. In one of these cuts there was found a drain for the acropolis, made of large tubular ceramic tiles.

During the 1957 season a small temple structure in the north plaza was investigated rather fully as well as a mound south of the acropolis that contained a plaster surfaced platform without any brick construction. Further stratigraphic testing was done at several localities and the map of the site begun in the previous year was completed.

The 2 seasons' work at Comalcalco show the site to be one of intensive occupation by a large population predominantly, if not completely, of the Late Classic period. The use of fired brick for construction appears late in the history of the site, superseding earthen platforms surfaced with lime mortar and topped with structures of perishable materials. Brick structures occur only superficially as the latest additions to these earlier buildings, probably toward the very end of the Classic period. In one structure remnants of unfired adobe brick walls were found between the earlier earth-plaster structures and those of fired bricks.

Little can be said as yet of Comalcalco ceramics, but the principal and obvious ties are with the Classic period sites of eastern Tabasco, Campeche, and the Palenque region. There is little indication in the ceramic and other materials gathered that Comalcalco played an important role as a trading center during the Classic period such as the region in which it lies apparently did in the Postclassic.

CHIAPAS. The New World Archaeological Foundation has been engaged for over a year in excavations at the site of Chiapa de Corzo, not far from Tuxtla Gutierrez on the Río Grande de Chiapas, a little known region on the

periphery of the Maya area. The work is now under the direction of Gareth W. Lowe, with Bernard Golden assisting in archaeology and Eduardo Martínez E. in topography. Keith A. Dixon is in charge of ceramic studies. The importance of the site lies not only in the archaeologically new region it represents, but also in its period of occupation which extends from times that precede the Mamon phase in the Petén to the Early Classic period, when the site was largely abandoned. Thus it affords an unusually good opportunity for studying the transition between the Preclassic and the Classic periods, which nowhere else has been followed consecutively and which still presents vital problems of interpretation. One of the characteristic ceramic types found at the site, and upriver almost to the Guatemala border, is described as an incense burner "consisting of a simple low open bowl with three horns of varying size located in the bottom of the bowl, surrounding a central hole or vent."

Although the ceramic complex is new, the sequence apparently has sufficient relation to Maya sequences to be correlated with them successfully. Two Early Classic tombs have been excavated, and one of still earlier date, containing stuccoed tetrapods, one of which is decorated with the Usulután resist technique under the stucco. From this Protoclassic tomb also came 2 bones carved in a sophisticated and hitherto unknown style. The tombs are associated with the final occupation of mounds, and it is hoped that excavation into earlier construction will yield cache material of preceding periods.

The major work of digging and reconstruction was concentrated on a large mound ascended by a balustraded stairway and bearing traces of walls on the summit. Several building phases were indicated. The masonry is of worked stone locally called "piedra bofa," laid in mud mortar and surfaced with stucco. Earlier constructions at the site resemble in technique the clay-surfaced earth structures of Preclassic date in highland Guatemala.

Last summer's work was to terminate by September, to be followed by study of the materials and preparation of reports. In addition to investigation of Chiapa de Corzo, work is planned at Laguna Francesca and at Santa Rosa, farther upriver, the former a site with Late Classic constructions apparently overlying Preclassic mounds. These excavations, together with the recently announced radiocarbon dates (P. Drucker, R. F. Heizer, R. J. Squier 1957, Radiocarbon Dates from La Venta, Tabasco, *Science*, Vol. 126, No. 3263, pp. 72-3), which now place the La Venta culture in a period from 850 to 490 B.C., should do much to clarify the transition between the Preclassic and the Early Classic periods in Middle America.

Also in the Grijalva-Río Grande valley, but nearer the Guatemala border, the University of Chicago is conducting an experimental program of cooperative research supported by a grant of the National Science Foundation. The project emphasizes the relations between ecology and culture and includes geographical, ethnographical, and archaeological studies. It is directed by Sol Tax, assisted by Phillip L. Wagner and Robert M. Adams. Participating as ethnobotanist is Lawrence Kaplan; as geographer, Mr. Guzman; and as anthropologist, Duane Metzger. No archaeological results have at the time of writing been reported, but field work is planned for the coming season.

MAYA AREA. The Tikal project, sponsored by the University of Pennsylvania Museum, completed another 4 months field season last May under the direction of E. M. Shook, accompanied by William R. Coe and Vivian Broman, archaeologists, James Hazzard, topographer, and Walwin Barr, assisting with photography. The lack of water at the site continues to be a major obstacle to beginning large scale operations, but work is proceeding and every effort (including dowsing!) is being made to find a solution to the problem, with the hope that in the coming season, major excavations can be undertaken. Last season, drilling equipment was brought in by plane, but although 3 attempts were made to reach water and a depth of 530 feet was attained, no water was found. If further attempts fail, other courses will be tried, and it is possible that the clearing of pre-Columbia reservoirs that once served the city will be attempted. Seven have now been located in different locations at the site.

The major task of mapping the area of about 16 sq. km. containing the principal known ruins was begun this year by Morris R. Jones, assisted by James Hazzard, who took over the work after Jones's departure. About 1 sq. km. of the site is now completely mapped. Thorough clearing and preliminary excavations in anticipation of more intensive work next season were begun in 2 small groups, each of which is composed of 2 facing pyramids and an enclosure containing a stela of middle Late Classic date and an accompanying altar. Another locus of excavations was in an outlying group, where an early broken stela had been reset in Late Classic times. Here burials and a vaulted crypt of Late Classic date were discovered, and an earlier platform was partially exposed. Two additional new sculptured monuments were recorded: an Early Classic stela, apparently broken in ancient times, and a Late Classic stela at the foot of Temple III, which formerly was known, but recorded as without carving.

The interiors of Temples I, III, and IV were cleaned, and careful measurements taken of all recoverable lintel fragments to determine the original locations of those that have been removed. In the course of these operations, previously unrecorded carving was found on a lintel in Temple III, with a substantial part of the carved scene excellently preserved. Another new discovery is of a sizable group of palace structures and a temple in the uncleared bush southwest of Temple IV.

Linton Satterthwaite, chief archaeologist of the project, spent 3 weeks at the site, giving particular attention to the newly discovered monuments and their inscriptions. Lester Walker of the University of Georgia visited the expedition to record graffiti, and biological studies were pursued by several visiting scientists.

Another project that promises to yield spectacular results was started last season by E. Wyllys Andrews at Dzibilchaltun, Yucatán, with Willard Sloshberg, graduate student of Tulane University, as assistant. The site, north of Mérida and about 10 miles from the coast, has proved

to be of enormous size. The main ruins stretch east and west for about 8 km. along an ancient sacbe, and extend 4 to 6 km. in a north-south direction. Other sacbes radiate from a large plaza near the center of the site, and scattered remains of multichambered vaulted buildings surround the densely built-up area for a considerable distance. More significant than the size of the settlement, however, is evidence of its almost uninterrupted occupation from at least late Formative to Colonial times, and an abundance of trade pottery and local types comparable to those of the Petén. A rubbish deposit 3 m. deep, with 4 well-marked strata, yielded 150,000 sherds, a collection that should definitely solve some of the knotty problems still present in the pottery sequences so far worked out for northern Yucatán.

The site of Dzibilchaltun presents a wealth of Classic Puuc architecture, as well as many earlier vaulted constructions of block and slab masonry, all unfortunately in very ruined condition. One partially standing temple of block and slab masonry chosen for excavation and solidification revealed stratified constructions of Late Classic date containing Tepeu 2 trade wares. Six burial crypts yielded numbers of whole pieces of contemporary local wares. Remains above floors and beneath vault debris show that the building was used as living quarters in Postclassic and Colonial times. Elsewhere, Postclassic construction was encountered only in the form of additions or alterations to Classic buildings, though the site has by no means been thoroughly covered, and the intensity of the late occupation is as yet unknown. Twenty-five stelae are reported from the site, six with badly eroded remains of carving. Photographs of some seen by the writer appear to place them in the first half of the Late Classic period.

D. Conkle and W. Robinett, undergraduate students of anthropology at the University of Florida, visited the site during the winter and spent several days in diving with aqua-lungs into one of the large cenotes near the center of the site, from which they recovered numbers of whole water jars. The richest deposits in this cenote, however, are at a depth dangerous for skin diving.

In our April issue, we had occasion to mention another skin diving exploit, made by Mr. Liekens in Guatemala. By mistake "Lake Atitlan" was reported as the place where incense burners were recovered. This should read "Lake Amatitlan." I wish to extend my apology both to our readers and to Mr. Liekens for the careless slip.

Last season in the Guatemala highlands, Henri Lehmann continued excavations in Group B at Mixco Viejo, where a ball court and adjacent mounds were studied and restored. Plans for building a road to the ruins were under consideration.

The excavations at Kaminaljuyú, directed by Gustavo Espinosa, have revealed a very complex series of constructions under Ball Court A. Stephan Borhegyi of the University of Oklahoma again took a number of students on a summer expedition to the site to assist in the excavations, on which we hope to report in the next issue.

Early in June we had news from Alberto Ruz L'hullier, in charge of excavations at Palenque, who tells of following a vertical conduit under the sanctuary floor of Temple XVIII-A and of coming upon a vaulted tomb containing 2 burials with offerings of pottery and jade. The open conduit to the tomb is similar to one found with the now famous tomb of the Temple of the Inscriptions, and is picturesquely termed a "psicoducto."

A. H. Anderson and Adrian Digby explored last season a small site called "Las Cuevas" in British Honduras. The name apparently derives from a large cave, which was partially explored by Digby. It contained many jar sherds and a number of platforms faced with rough stone and surfaced with stucco. Most of the material recovered was Postclassic in date. The site itself, mapped and explored by Anderson, probably goes back to Classic times. Its masonry is of rough boulders of exceptionally hard crystalline limestone with occasional shaped stones. There is a pyramid about 35 feet high, a ball court, a number of other mounds, and several sacbes.

In May 2 new Classic Maya stelae and an altar were discovered by Ramón Rodríquez A. at sites on the left bank of the Río de la Pasion, 32 and 38 km. downstream from Sayaxché, Guatemala. The first site is 2 km. inland from "La Covadonga," the second is at a place known as Buena Vista. The sites were later visited by Antonio Tejeda F. and David Vela and plans were discussed for transport of the monuments to the National Museum of Guatemala.

Valley of Mexico. Five successive earth floors dating from the Teotihuacán I period at Teotihuacán were found in a test pit in August by René Millon of the University of California at Berkeley. These represent the first constructions definitely associatable with the Teotihuacán I period at Teotihuacán and help to clear up its hitherto ambiguous position in the Teotihuacán sequence. A cache of sherds below the lowest floor contained sufficient material to enable the reconstruction of the form of 3 vessels, one of which, a straight sided cylindrical vessel with a flat bottom and a flaring lip, seems to be ancestral to the later Teotihuacán cylindrical tripod vessels. On the vessel is a representation in negative painting of the Earth Monster god, the first known from Teotihuacán I. Another new Teotihuacán I element found was a representation of Tlaloc. The 5 successive floors demonstrate that the practice of successive reconstructions over the same spot, so characteristic of later Teotihuacán periods, also had its beginning in Teotihuacán I. Even though only one test pit was dug, 2 by 2 m. and 2 m. deep, it is now clear that many of the elements considered characteristic of Classic Teotihuacán clearly had their beginning in Teotihuacán I. James Bennyhoff participated in the survey which led to the discovery of the site and Carmen Leonard assisted in the making of the pit.

Assembled by Tatiana Proskouriakoff

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